

A Review of the Asian Goblin Spider Genus *Camptoscaphiella* (Araneae: Oonopidae)

BARBARA C. BAEHR¹ AND DARRELL UBICK¹

ABSTRACT

The goblin spider genus *Camptoscaphiella* Caporiacco has been shrouded in mystery because its type species, *C. fulva* Caporiacco, was based on a juvenile specimen and considered a nomen dubium. The discovery of near-topotypic material, including both males and females, now permits a more complete description of the type species and name stabilization with some certainty. *Camptoscaphiella* is here delimited to include only those species with the combined presence of a greatly enlarged male palpal patella, a palpal bulb well separated from the cymbium, male endites with anteromedian brushlike scopula, male abdomen with the dorsal and ventral scuta fused anteriorly, female genitalia with an external copulatory opening, and with extremely long paired spines on the tibiae and metatarsi of legs I and II in both sexes. *Camptoscaphiella* now includes 15 species, mostly recorded from single locations and distributed primarily in the Himalayan Mountains, from Pakistan to China, but with two isolated species in Sri Lanka and Thailand. The type species, *C. fulva* Caporiacco, is here described and *Camptoscaphiella hilaris* Brignoli from Bhutan redescribed. Nine species are newly described: *C. gunsa* Baehr, n. sp. (♀), and *C. loebli* Baehr, n. sp. (♂ ♀), from North India; *C. martensi* Baehr, n. sp. (♀), *C. nepalensis* Baehr, n. sp. (♂ ♀), *C. panchthar* Baehr, n. sp. (♀), and *C. taplejung* Baehr, n. sp. (♀), from Nepal; *C. paquini* Ubick, n. sp. (♂ ♀), from China; *C. schwendingeri* Baehr, n. sp. (♂), from Thailand; and *C. simoni* Baehr, n. sp. (♂), from Sri Lanka. These species, along with

¹ Queensland Museum, P.O. Box 3300, South Brisbane, Queensland 4101, Australia (BarbaraB@qm.qld.gov.au); Centre for Sustainable Ecosystem Restoration, School of Environmental and Life Sciences, University of Newcastle, Callaghan NSW 2308, Australia (Barbara.Baehr@newcastle.edu.au).

² Department of Entomology, California Academy of Sciences, San Francisco, California 94118, USA (dubick@calacademy.org).

C. silens Brignoli and *C. strepens* Brignoli from Nepal and *C. sinensis* Deeleman-Reinhold and *C. tubers* Tong and Li from China, are included in the key and mapped. Excluded from *Camptoscaphiella* is *C. infernalis* Harvey and Edward from Western Australia that, along with *Opopaea fosuma* Burger et al. from Sumatra, represents an undescribed genus.

INTRODUCTION

The goblin spider family Oonopidae presently contains about 500 described species (Platnick, 2009). Because of their small size (1–3 mm) and cryptic habits, goblin spiders have been grossly undersampled and current estimates suggest that the actual number of species may be over 2000. Oonopids are actually rather abundant and diverse in certain terrestrial habitats, especially in leaf litter and beneath rocks and logs, and are even represented in the forest canopy (Fannes et al., 2008). The goblin spider fauna is richest in tropical and subtropical regions, from where many new taxa are currently being described (Platnick and Dupérré, 2009a, 2009b; Baehr et al., in press; Abraham, in press; Grismado, in press). A less rich oonopid fauna extends to the temperate regions and a few taxa, such as the genus *Camptoscaphiella*, even occur at very high elevations (3000–4000 m).

The genus *Camptoscaphiella* was created by Caporiacco (1934) and based on a subadult female from Pakistan that was described as *C. fulva* Caporiacco (1934). To date seven species are known, but the type species is classified as a nomen dubium by Platnick (2009) because the specimen is a juvenile female, which Brignoli (1976) called “a classic example of a *species inquirenda*.” Nevertheless, the heart-shaped sternum and the spination of the first two pairs of legs (tibiae I and II with 4 pairs of long spines and metatarsi I and II with 2 pairs of long spines) were believed to be good characters to separate this genus from most other goblin spider genera. Brignoli (1976) retained the genus, composed an emended generic description containing the weak dorsal and ventral scutes as important additional characters, and described two new species based on females, *C. strepens* Brignoli (1976) and *C. silens* Brignoli (1976) from Nepal. The male of the genus was first described in 1978 as *C. hilaris* Brignoli (1978) from Bhutan. Its greatly enlarged palpal patella and a well-separated cymbium and bulb provided clearly derived genitalic characters for the genus. A detailed study of the female genitalia was not conducted here, but preliminary observations suggest some possible synapomorphies in the shape of the receptaculum and its attachment to the postepigastric scutum. As was first indicated by Brignoli (1976: figs. 1–2) and corroborated here (figs. 150–151), *Camptoscaphiella* appears to have an external copulatory opening located just posterior of the gonopore. This entelegyne condition is unexpected in haplogynes, but appears in several other oonopid genera, including *Antoonops* (Fannes and Jocqué, 2008), *Scaphiella* and *Triaeris* (Burger, 2009), and *Ischnothyreus* (fig. 326).

The blind troglobites *C. sinensis* Deeleman-Reinhold (1995) from China and *C. infernalis* Harvey and Edward (2007) from Australia were later added to the genus. Whereas *C. sinensis* shows the typical spination of the first two pairs of legs, the extremely large palpal patella, and the well-separated bulb and cymbium, *C. infernalis* lacks the leg spination and has a palpal patella that is only slightly enlarged. During the course of the revisionary work of the goblin

spider Planetary Biodiversity Inventory (PBI), it became clear that *Opopaea fosuma* Burger et al., 2002, from Sumatra shares most of the special features with *C. infernalis*, although the former's eyes are well developed. These two species will be transferred to a new genus in a subsequent publication.

As the lectotype of *C. fulva* Caporiacco, deposited at the Natural History Museum, Milan, is juvenile, shrunken, and without any legs (Brignoli, 1976), it is very fortunate that there are three vials containing three males from the Natural History Museum in Geneva collected very close to the type locality. *Camptoscaphiella fulva* was collected in Pakistan, Karakoram near Askole 35°59'N, 75°49'E (coordinates derived from Google Earth) at an altitude of 3100 m, and the new males were collected in Pakistan, Hazara district, Kaghan Valley 35°07'N, 73°59'E. We describe the male and female of *C. fulva* for the first time.

MATERIALS AND METHODS

Specimens were examined using a LEICA MZ16A microscope. Photomicrographic images were produced using a Leica DFC 500 and the software program AutoMontage Pro Version 5.02 (p). Specimens used for scanning electron microscopy were dehydrated in 100% ethanol, critical point dried, sputter coated, and imaged with a LEO 1450 VP SEM. Some female genitalia were cleaned with pancreatin, as described by Álvarez-Padilla and Hormiga (2008). Descriptions were generated with the aid of the PBI descriptive goblin spider database and shortened where possible. In the species descriptions, maps were created with Biolink version 1.5 (CSIRO Entomology, Canberra, Australia; <http://www.biolink.csiro.au/>). Drawings are of the left palp. All measurements are in millimeters. Abbreviations are used in the text as follows: ALE = anterior lateral eyes; ALS = anterior lateral spinnerets; H = height of male palpal patella (fig. 161); L = length of male palpal patella (fig. 161); P = posterior extension of male palpal patella from femur attachment (fig. 161); PLE = posterior lateral eyes; PLS = posterior lateral spinnerets; PME = posterior median eyes; PMS = posterior median spinnerets; PR = projection ratio of male patella = P/L (fig. 161).

Full-color, high-resolution versions of the images will be available on the PBI website (<http://research.amnh.org/oonopidae>).

COLLECTIONS EXAMINED

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| CAS | California Academy of Sciences, San Francisco, U.S.A. |
| HNU | Hunan Normal University, Changsha, China |
| MHNG | Muséum d'Histoire Naturelle, Geneva, Switzerland |
| MNHN | Muséum National d'Histoire Naturelle, Paris, France |
| NMB | Naturhistorisches Museum, Basel, Switzerland |
| RMNH | Nationaal Natuurhistorisch Museum, Leiden, Netherlands |
| SMF | Senckenberg Museum, Frankfurt am Main, Germany |
| WAM | Western Australian Museum, Perth, Australia |
| ZII | Zoological Institute Innsbruck, Austria |

SYSTEMATICS

Camptoscaphiella Caporiacco

Camptoscaphiella Caporiacco, 1934: 118, pl. 1, f. 1 (type species *Camptoscaphiella fulva* Caporiacco). Brignoli, 1976: 252.

DIAGNOSIS: Because the type species is described from a juvenile female we present here the first description of the male and female. The heart-shaped sternum, which has a semicircular depression in the middle half of the anterior margin in males, the spination of the first two legs (tibiae I and II with 4 pairs of long spines and metatarsi I and II with 2 pairs of long spines; figs. 205, 215, 233, 251, 261, 272, 296, 332, 348), the combination of an enormous male palpal patella and the bulb well separated from the cymbium with a narrow connection (figs. 139, 140, 333, 335), the brushlike structure of setae at the anterior-median part of the endites in males (figs. 29, 30, 32) and the female genitalic conformation (figs. 182–199) are good characters to recognize the genus.

DESCRIPTION: Total length of males 1.2–2.0, of females 1.8–2.3. Carapace pale orange to yellow-brown, without any pattern, broadly oval in dorsal view (figs. 2, 10, 212, 230, 248, 258, 269, 279, 288, 293, 345), pars cephalica strongly elevated in lateral view (figs. 3, 11, 16, 24), anteriorly narrowed to 0.49 times its maximum width or less, with rounded posterolateral corners, posterolateral edge without pits, posterior margin not bulging below posterior rim, anterolateral corners without extension or projections, posterolateral surface without spikes, surface of elevated portion of pars cephalica and sides striated or strongly reticulate, thorax without depressions, fovea absent, without radiating rows of pits; lateral margin undulate, rebordered (fig. 34), without denticles, plumose setae near posterior margin of pars thoracica absent; nonmarginal pars cephalica setae light or dark, needlelike, present in one row or scattered (figs. 17, 25), nonmarginal pars thoracica setae absent (fig. 24), marginal setae light or dark, needlelike. Clypeus margin unmodified, straight in front view (figs. 18, 23), sloping forward in lateral view (figs. 19, 27), high; ALE separated from edge of carapace by their radius or more, median projection absent; setae present, light or dark, needlelike. Eyes: six, well developed, subequal or ALE largest (figs. 26, 28), ALE circular, PME squared, PLE circular; posterior eye row procurved from both above and front (figs. 20, 26, 28); ALE separated by less than their radius, ALE-PLE touching, PME touching for less than half their length, PLE-PME touching. Sternum as long as wide (figs. 1, 9), yellowish white or pale orange, uniform, not fused to carapace, median concavity absent, with shallow radial furrows between coxae I–II, II–III, III–IV (fig. 37), surface smooth, without pits, microsculpture absent, sickle-shaped structures absent, anterior margin with semicircular depression in middle half with rounded anterolateral process in males (fig. 33), anterior corner unmodified in females, lateral margin with infracoxal grooves (fig. 38), distance between coxae approximately equal, with narrow extensions between coxae and extensions of precoxal triangles present (figs. 201–202, 211, 216, 221–222, 229, 234, 239–240, 247, 252, 257, 262, 268, 273, 285, 292, 297, 305, 315, 328–329, 337, 344, 349), lateral margins unmodified, without posterior hump; setae abundant, light or dark, needlelike, evenly scattered, originating from small pits, without hair tufts. Mouthparts: chelicerae, endites, and labium pale orange. Chelicerae (figs. 39, 42)

straight or slightly divergent, anterior face unmodified; promargin without teeth or with one tooth (fig. 40), retromargin without teeth (figs. 223, 224); without toothlike projections, fangs directed medially, shape normal, without prominent basal process, tip unmodified; setae dark, needlelike, densest medially; paturon inner margin with scattered setae, distal region unmodified, posterior surface unmodified, promargin with row of flattened setae, inner margin unmodified, laminate groove absent. Labium (figs. 31, 35) triangular, not fused to sternum, anterior margin indented at middle, same as sternum in sclerotization; with 6 or more setae on anterior margin, subdistal portion with unmodified setae. Endites distally excavated in male, rounded in female, serrula present in single row (figs. 21, 29–30, 32, 35–36, 40), anteromedian region in male a projecting lobe with brush of modified setae (fig. 32), in female rounded and with dense scopula of simple setae (fig. 36), posteromedian part unmodified, same as sternum in sclerotization. Abdomen ovoid (figs. 4–6, 12, 14–15), without long posterior extension, rounded posteriorly, interscutal membrane rows of small sclerotized platelets absent posteriorly; dorsum soft portions white, without color pattern. Book lung covers large, ovoid (figs. 235, 309), without setae, antero-lateral edge unmodified. Posterior spiracles connected by groove. Pedicel tube short, ribbed or plain (fig. 22), scutopedicel region unmodified (fig. 253), scutum extending far dorsal of pedicel (figs. 204, 214, 232, 242, 250, 260, 271, 280, 288, 295, 303, 313, 319), plumose hairs absent, matted setae on anterior ventral abdomen in pedicel area absent, cuticular outgrowths near pedicel absent. Dorsal scutum weakly sclerotized (figs. 65, 66, 210), yellow-brown to pale orange, without color pattern, covering $\frac{1}{4}$ to the whole length of abdomen, between $\frac{1}{4}$ and $\frac{1}{2}$ abdomen width, fused to epigastric scutum in males (figs. 5, 206, 241, 308) except in *C. simoni* (fig. 338) and *C. schwendingeri* (fig. 331), not fused in females, middle surface smooth, sides smooth, anterior half without projecting denticles. Epigastric scutum weakly sclerotized, surrounding pedicel, not protruding, small lateral sclerites present in females (figs. 216, 217); postepigastric scutum weakly sclerotized, pale orange, short, covering about $\frac{1}{3}$ of the abdominal length, fused to epigastric scutum in males, anterior margin with triangular lateral joints fitting under epigastric scutum in females (figs. 263, 265), without posteriorly directed apodemes in males but present in females (fig. 266, arrow). Spinneret scutum absent. Dorsum, epigastric area and postepigastric area setae present, light or dark, needlelike. Dense patch of setae anterior to spinnerets absent. Interscutal membrane with setae. Colulus represented only by setae (fig. 56). Spinnerets in females (based on *C. paquini*, figs. 59, 63, 64): ALS (fig. 60) with 4 spigots, a larger median one surrounded by 3 smaller ones; PMS (fig. 62) with 4–6 subequal spigots; PLS (fig. 61) with 9 subequal spigots; spinnerets in males (figs. 52, 56, 57, 58): ALS (fig. 53) with 3 spigots, a larger median one surrounded by 2 smaller ones; PMS (fig. 55) with 2 subequal spigots; PLS (fig. 54) with 4 subequal spigots. Legs: yellow or white, without color pattern; femur IV not thickened, same size as femora I–III, patella plus tibia I longer than carapace, tibia I unmodified, tibia IV specialized hairs on ventral apex absent, tibia IV ventral scopula absent, metatarsi I and II mesoapical comb absent, metatarsi III and IV weak ventral scopula absent, tibiae with “Emerit’s glands,” which are circular depressions on the cuticle that lack visible pores and most probably represent regions of muscle attachment (fig. 47). Leg spination in males (only surfaces bearing spines listed, all spines longer than segment width): tibiae I–II v4-2-2 (figs. 67–72); metatarsi I–II v2-2-0 (figs. 73–75). Tarsi (figs. 76–78) I–IV superior claws examined in detail (in *C. paquini*,

figs. 116–126); all surfaces striated; proclaws and retroclaws I–III each with 3 subapical teeth along outer margin; proclaw IV with 2 basal teeth; retroclaw IV with 4 teeth; teeth actually originate from the ventral surface and bend outwards; inner margins without apparent teeth. Tarsi I to IV without inferior claw. Leg spination in females: femur I p0-2-0 or p0-2-1; tibiae I–II v4-2-2 (figs. 79–82); metatarsi I–II v2-2-0 (figs. 83–86), (figs. 205, 215, 233, 251, 261, 272, 296, 332, 348). Tarsi (figs. 87–90), tarsal claws (figs. 127–138) as in male, except that female retroclaw IV has only 2 subapical teeth (4 in male). Trichobothria (figs. 95–102, 108–115) examined with SEM; tibiae: each with 3; metatarsi: each with 1; base longitudinally narrowed, aperture internal texture not grate-like, hood covered by numerous low, closely spaced ridges. Tarsal organ with 1 small and 1–2 larger sensilla visible; 2 sensilla on palpal tarsus and legs III–IV, 3 sensilla on legs I–II (figs. 91–94, 103–107). Male genitalia: epigastric region with large, circular or oval sperm pore situated at level of anterior spiracles, rebordered (figs. 48–50). Palp (figs. 139–145): right and left palps symmetrical, proximal segments red-brown; embolus dark, prolateral excavation absent; trochanter normal size, unmodified; femur normal size, 1–2 times as long as trochanter, without posteriorly rounded lateral dilation, attaching to patella medially; patella much larger than femur, without prolateral row of ridges, setae unmodified; cymbium orange-brown, ovoid, narrow or rectangular in dorsal view, not fused with bulb not extending beyond distal tip of bulb, bulb attached to cymbium with a narrow connection, plumose setae absent, without stout setae, without distal patch of setae; bulb orange-brown, more than 2 times as long as cymbium, stout, tapering apically. Embolar region distally on bulb, usually bifurcate, with pointed ventral prong (“conductor”) and larger dorsal embolus. Embolus flattened, variably twisted and ornamented; conductor simple or with additional branch. Conductor apparently absent (or fused with embolus) in *C. paquini*, n. sp., and possibly also in *C. schwendingeri*, n. sp. Female genitalia (figs. 146–153), postepigastric scutum widely hexagonal, with or without free lateral sclerites, with or without median plate and short or longer naillike anterior sclerite (figs. 182, 184, 190, 188, 186, 192, 194, 196, 198). Copulatory duct narrow, short or long, straight or curved posteriorly bent, originating close to epigynal fold (figs. 183, 185, 191, 189, 187, 193, 195, 197, 199); with external opening (fig. 150), apodemes (figs. 158, 255, 290, 352) originating halfway between epigynal fold and posterior groove, posteriorly directed reaching beyond posterior groove.

The species descriptions contain only the differences from the generic description. The descriptions of the females includes only the differences from the males’ descriptions. Leg spination descriptions mention only those surfaces bearing spines.

KEY TO SPECIES

1. Eyes absent (Deeleman-Reinhold, 1995: figs 1, 3) *C. sinensis*
 – Eyes present (as in figs. 10, 17) 2
2. Males (unknown for *C. gunsa*, *C. martensi*, *C. panchthar*, *C. taplejung*, *C. silens*,
C. strepens) 3
 – Females (unknown for *C. hilaris*, *C. simoni*, *C. schwendingeri*) 10
3. Embolar region lacking spinelike conductor (figs. 173, 179) 4
 – Embolar region with spinelike conductor (figs. 161, 164, 167, 170, 176) 5

4. Carapace with dark brown median stripe (fig. 327); embolar region expanded laterally (figs. 173–175, 333–335) *C. schwendingeri*
- Carapace color uniform (fig. 302); embolar region compact (figs. 179–181) ... *C. paquini*
5. Cymbium rectangular in dorsal view (fig. 165) *C. hilaris*
- Cymbium rounded in dorsal view (fig. 162) 6
6. Bulb ventrally greatly bulged, distal end inverted T-shaped from dorsal view (figs. 167–169) *C. simoni*
- Bulb not ventrally bulged (fig. 171), distal end not T-shaped 7
7. Conductor a single prong (figs. 161, 176) 8
- Conductor with two prongs (fig. 170) 9
8. Distal part of palpal bulb with prolateral rim (figs. 176–178, 181–183) *C. nepalensis*
- Distal part of palpal bulb without prolateral rim (figs. 161–163) *C. fulva*
9. Distal part of palpal bulb with prolateral rim (Tong and Li, 2007: figs. 25–27) *C. tubersans*
- Distal part of palpal bulb without prolateral rim (figs. 170–172) *C. loebli*
10. Copulatory duct transversely sinuous (fig. 197) *C. paquini*
- Copulatory duct straight or only slightly curved (figs. 183, 185, 187, 189, 191, 193, 195, 199) 11
11. Copulatory duct short, not extending beyond postepigastric scutum (figs. 183, 185, 191) 12
- Copulatory duct extending well beyond postepigastric scutum (fig. 199) 19
12. Copulatory duct short, not extending beyond anterior $\frac{1}{4}$ of postepigastric scutum (fig. 183) 13
- Copulatory duct longer, extending to posterior groove (figs. 185, 191) 14
13. Anterior sclerite situated close to epigastric fold (fig. 276; Brignoli, 1976: figs. 2, 6) *C. silens*
- Anterior sclerite situated in the middle of epigastric area (fig. 183) *C. fulva*
14. Median plate small and circular, copulatory duct long, straight and internally convoluted (figs. 184, 185) *C. gunsa*
- Median plate larger not circular, copulatory duct not internally convoluted 15
15. Posteriorly directed lateral apodemes short, not reaching posterior groove (fig. 195) 16
- Posteriorly directed lateral apodemes long, reaching posterior groove (figs. 189, 193) 17
16. Apodemes short triangular, median plate inverted pear shape (fig. 195) *C. panchthar*
- Apodemes longer, median plate circular (Tong and Li, 2007: figs. 22, 24) *C. tubersans*
17. Anterior sclerite large and conical, copulatory duct straight (figs. 190, 192) ... *C. martensi*
- Anterior sclerite small, not conical, copulatory duct slightly sinuous (figs. 189, 187) 18

18. Median plate oval, reaching only half of epigynal area (fig. 186) *C. loebli*
 – Median plate square, close to posterior margin of epigynal area (fig. 188) ... *C. taplejung*
 19. Median epigynal plate posteriorly rounded (fig. 198) *C. nepalensis*
 – Median epigynal plate posteriorly angular (fig. 269; Brignoli, 1976: fig. 1) *C. strepens*

Camptoscaphiella fulva Caporiacco

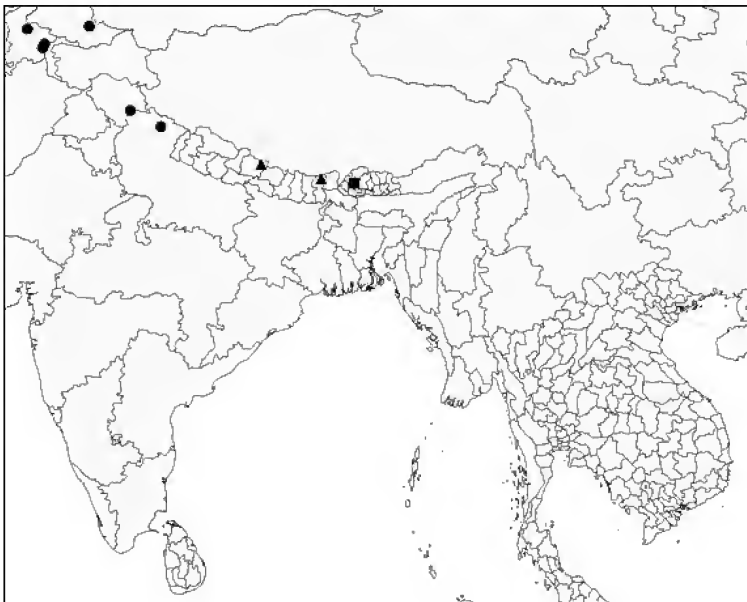
Figures 161–163, 182, 183, 200–219; map 1

Camptoscaphiella fulva Caporiacco, 1934: 118, pl. 1, fig. 1 (juvenile). Brignoli, 1976: 252.

TYPE: Juvenile lectotype, from Pakistan, Karakorum, Askole [35°59'N, 75°49'E], “zona aride sopra l'oasi,” 3000 m (May 1929, L. di Caporiacco), deposited at the Natural History Museum, Milan, not examined.

DIAGNOSIS: Males can be easily recognized by the bulbal tip with two spinelike processes on either side of tip and a retrolateral fold. The females from India and Pakistan here assigned to the species were not collected together with males, but are a close match in somatic structure and add only a slight extension to the distribution shown by the few available males. Females can be recognized by their small pointed anterior sclerite and the short inverted drop-shaped copulatory duct (figs. 182–183).

MALE (PBI_OON 15528, figs. 200–209): Total length 1.27. Carapace, sternum chelicerae, endites, and labium yellow-brown. Eyes: ALE 0.048; PME 0.047; PLE 0.047, ALE largest, ALE



MAP 1. Records of *Camptoscaphiella fulva* (circles), *C. gunsa* (triangles) and *C. hilaris* (square).

circular, PME oval, PLE circular; ALE-PLE separated by less than ALE radius, PME touching throughout most of their length. Abdomen oval, scutae yellow-brown; dorsal scutum weakly sclerotized, covering more than $\frac{3}{4}$ of abdomen, more than $\frac{1}{2}$ to most of abdomen width, fused to epigastric scutum, middle surface and sides smooth. Postepigastric scutum almost semicircular, covering about $\frac{1}{2}$ of abdominal length. Legs: pale orange. Epigastric region with large circular sperm pore. Palp orange-brown; patella: L, 0.48 mm; P, 0.34 mm; PR, 0.71; H, 0.15 mm; L/H, 3.2; tibia short, globular; cymbium narrow in dorsal view; bulbal tip with two spine-like processes on either side of tip and with retrolateral fold (figs. 161–163).

FEMALE (PBI_OON 12527, figs. 210–219): Total length 1.97. Eyes: ALE 0.085; PME 0.080; PLE 0.077. Dorsal scutum not fused to epigastric scutum. Legs: femur I with 2 long prolateral spines additionally. Anterior sclerite short, pointed, situated in the middle of epigastric area; copulatory duct short, inverted drop shape; apodemes strong (figs. 182–183).

OTHER MATERIAL EXAMINED: **INDIA: Himachal Pradesh:** Mashobra Forest, 10 km NE-Simla, 2100 m, 31.16666°N, 77.58333°E, 30 Oct 1988, S. Vit, 3 ♀ (MHNG PBI_OON 12807). **Uttar Pradesh:** Garhwal: 10 km E of Dhanolti, 2450 m, 30.25000°N, 79.33333°E, 21 Oct 1979, I. Löbl, 2 ♀ (MHNG PBI_OON 12527). **PAKISTAN:** Kaghan Valley, Malkandi Frst (Hazara), 1450 m, 34.68333°N, 73.46666°E, 29 Jun 1985, S. Vit, 1 ♂ (MHNG PBI_OON 12472); 1 ♂ (MHNG PBI_OON 12528); 1 ♂ (MHNG PBI_OON 12555). **Swat:** Kalam, 2100 m, 35°31'N, 72°34'E, 12 May 1983, C. Besuchet, I. Löbl, 1 ♀ (MHNG PBI_OON 16184).

DISTRIBUTION: India and Pakistan (map 1).

Camptoscaphiella hilaris Brignoli

Figures 164–166, 220–227; map 1

Camptoscaphiella hilaris Brignoli, 1978: 33, figs. 1–3 (♂).

TYPE: Male holotype from Bhutan, Thimphu, 27°26'N, 89°40'E (31 May 1972, W. Wittmer), deposited in NMB (2296a, PBI_OON 23376), examined.

DIAGNOSIS: Males can easily be separated from all other species by the rectangular cymbium, the long triangular medially bent tip and prolateral spinelike process at the distal part of the bulb (fig. 164).

MALE (PBI_OON 23376, figs. 220–227): Total length 1.62. Carapace yellow-brown, pars cephalica strongly elevated in lateral view, surface of elevated portion and sides of pars cephalica finely reticulate. Clypeus margin unmodified, straight in front view, sloping forward in lateral view. Eyes: ALE 0.065, PME 0.060; PLE 0.060, ALE largest, ALE circular, PME oval, PLE oval; posterior eye row straight from both above and front; ALE-PLE touching, PME touching for less than $\frac{1}{2}$ their length. Sternum as long as wide, pale orange, not fused to carapace, surface finely reticulate, sternum heart shaped with bulged anterolateral corners. Chelicerae, endites, and labium yellow. Abdomen oval, scutae pale orange; dorsal scutum covering $\frac{1}{2}$ to $\frac{3}{4}$ of abdomen, between $\frac{1}{4}$ and $\frac{1}{2}$ abdomen width, not fused to epigastric scutum. Postepigastric scutum only around epigastric furrow. Epigastric region with large, circular sperm pore. Palp (figs. 164–166, 225–227) orange-brown; patella: L, 0.51 mm; P, 0.28 mm; PR, 0.54; H, 0.16 mm; L/H,

3.2; cymbium rectangular in dorsal view; distal part of bulb with long triangular medially bent tip and prolateral spinelike process.

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Bhutan (map 1).

Camptoscaphiella gunsa Baehr, new species

Figures 184–185, 228–237; map 1

TYPE: Female holotype, from India, Taplejung Distr., Gunsa, 3100 m, 27°40'N, 87°56'E (11 Sep 1983, Martens, Daams), deposited in SMF (PBI_OON 15715).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Females can be separated from all other *Camptoscaphiella* females by their tiny circular median plate and a copulatory duct that is long, narrow, straight, posteriorly directed, and internally convoluted.

MALE: Unknown.

FEMALE (PBI_OON 15715, figs. 228–237): Total length 2.82. Eyes: ALE 0.098, PME 0.081; PLE 0.093. Abdomen oval, dorsal scutum yellow-brown, covering less than ½ of abdomen and less than ¼ abdomen width. Legs: femur I with 2 prolateral spines additionally. Postepigastric scutum, epigynal area wide oval; with small anterior sclerite and small oval median plate; copulatory duct long, narrow, straight, posteriorly directed, internally convoluted with sharp tip just reaching posterior groove; apodemes thin, not reaching posterior groove (figs. 184, 185).

OTHER MATERIAL EXAMINED: **INDIA:** Himachal Pradesh, Dalhousie, 1950 m, 32°53'N, 75°59'E, 20 Oct 1988, S. Vit, 2 ♀ (MHNG PBI_OON 12766); 2 ♀ (MHNG PBI_OON 12863). **NEPAL:** Gorkha Dist., Chuling Khola, Djinsi Kharka, 3400 m, 28°26'N, 84°48'E, 4–5 Aug 1983, Martens, Schawaller, 2 ♀ (SMF PBI_OON 15732); Gorkha Dist., Chuling Khola, Djongshi Kharka, mixed forest, 3050 m, 28°26'N, 84°47'E, 5 Aug 1983, Martens, Schawaller, 1 ♀ (SMF PBI_OON 15741).

DISTRIBUTION: Himalayan mountains in North India and Nepal (map 1).

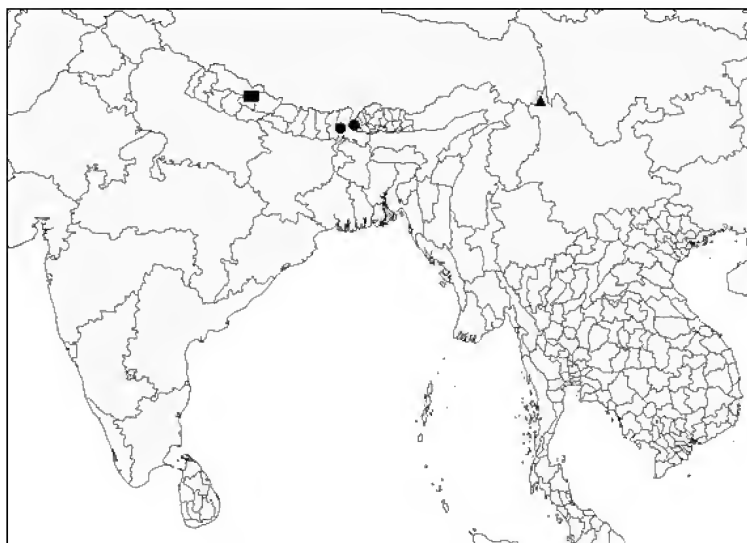
Camptoscaphiella loebli Baehr, new species

Figures 170–172, 186–187, 238–255; plate 1; map 2

TYPE: Male holotype, from India, Darjeeling at the heights of 1829 m, West Bengal, 27.03333°N, 88.26667°E (9 Oct 1978, C. Besuchet, I. Loebli), deposited in MHNG (PBI_OON 15618).

ETYMOLOGY: The specific name is a patronym in honor of I. Loebli, one of the collectors of the types.

DIAGNOSIS: Males resemble those of *C. nepalensis* in the enormous length of the palpal patella and the broad fusion of the dorsal scutum with the epigastric scutum but can easily be recognized by the bulbal tip with two long spinelike processes at the ventral side. Females can



MAP 2. Records of *Camptoscapbiella loebli* (circles), *C. martensi* (squares) and *C. tubersans* (triangle).

be separated from all other species by the oval median plate, the narrow anterior sclerite, which is about $\frac{1}{3}$ of median plate length and the long, narrow, slightly sinuous copulatory duct with broad triangular tip, reaching beyond posterior groove (fig. 187).

MALE (PBI_OON 15618, figs. 238–245): Total length 1.65. Carapace yellow-brown. Eyes: ALE largest, ALE 0.081; PME 0.072; PLE 0.074; PME touching throughout most of their length. Sternum heart shaped, yellow, surface smooth, with bulged anterolateral corners. Chelicerae, endites, and labium yellow. Chelicerae slightly divergent. Abdomen oval, dorsal scutum yellow-brown, covering more than $\frac{3}{4}$ of abdomen, more than $\frac{1}{2}$ to most of abdomen width, broadly fused to epigastric scutum. Postepigastric scutum yellow-brown, almost semicircular, covering about $\frac{2}{3}$ of abdominal length. Legs: yellow. Epigastric region with large circular sperm pore, unmodified. Palp (figs. 170–172, 243–245) red-brown; trochanter normal size; femur two or more times as long as trochanter; patella: L, 0.70 mm; P, 0.48 mm; PR, 0.69; H, 0.20 mm; L/H, 3.5; cymbium, narrow in dorsal view; bulb cymbium connection narrow. Embolus with two long spinelike ventral processes and retrolaterally directed fold.

FEMALE (PBI_OON 15407, figs. 246–255): Total length 1.95. Eyes: ALE 0.081; PME 0.074; PLE 0.072. Abdomen oval, dorsal scutum covering $\frac{1}{2}$ to $\frac{3}{4}$ of abdomen, not fused to epigastric scutum. Legs: femur I with 2 prolateral spines additionally. Postepigastric scutum, epigynal area with oval median plate and narrow anterior sclerite about $\frac{1}{3}$ of median plate length; copulatory duct narrow, long, sinuous with broad triangular tip reaching beyond posterior groove (figs. 186–187, 254, 255).

OTHER MATERIAL EXAMINED: INDIA: West Bengal: Distr. Darjeeling: Algarah, 1800 m, 27.03333°N, 88.26667°E, 9 Oct 1978, C. Besuchet, I. Löbl, 1 ♀ (MHNG PBI_OON 15407); 1 ♀ (MHNG PBI_OON 16159); 1 ♂ (MHNG PBI_OON 23382).

DISTRIBUTION: Himalayan mountains in North India (map 2).

Camptoscaphiella martensi Baehr, new species

Figures 190–193, 256–266; map 2

TYPE: Female holotype, from Nepal, Mustang Dist., forest clearing Thaksang, above Tukche (= Tukucha), 3150 m, in palearctic *Abies/Pinus* forest, 28°42'N, 83°40'E (26–29 Apr 1980, J. Martens, A. Ausobsky) deposited in SMF (PBI_OON 15724).

ETYMOLOGY: The specific name is a patronym in honor of Jochen Martens, Mainz, Germany, who carried out profound surveys of Nepal soil arthropod fauna from 1969 to 2004 and thus greatly contributed to our understanding of the Himalayan fauna and their origins.

DIAGNOSIS: Females can be separated from all other species by epigastric area with spoon-shaped median plate and big triangular anterior sclerite; copulatory duct long and narrow with spatulate tip reaching beyond posterior groove.

MALE: Unknown.

FEMALE (PBI_OON 15724, figs. 256–266): Total length 2.00. Carapace yellow-brown lateral margin undulate. Eyes: ALE 0.83; PME 0.71; PLE 0.73; ALE circular, PME squared, PLE oval; ALE-PLE touching, PME touching for less than half their length, PLE-PME touching. Sternum, chelicerae, endites, and labium yellow. Abdomen oval, dorsal scutum weakly sclerotized, yellow-brown, covering $\frac{1}{2}$ to $\frac{3}{4}$ of abdomen, between $\frac{1}{4}$ and $\frac{1}{2}$ abdomen width, not fused to epigastric scutum. Epigastric scutum postepigastric scutum yellow-brown, widely hexagonal, only around epigastric furrow. Legs: femur I with 2 prolateral spines. Epigastric area with relatively large, spoon-shaped median plate and triangular anterior sclerite, copulatory duct long and narrow with spatulate tip reaching beyond posterior groove (figs. 192, 193).

NOTES: The three females from Myagdi District N Dobang (PBI_OON 15718, PBI_OON 23384) look slightly different but probably belong to this species. To show these differences we also imaged a female from this locality (PBI_OON 15718, figs. 190–191).

OTHER MATERIAL EXAMINED: **NEPAL:** Mustang Dist., forest clearing Thaksang, above Tukche (= Tukucha), 3150 m, 26–29 Apr 1980, J. Martens, A. Ausobsky, 1 ♀ (PBI_OON 23383) (SMF); Myagdi Distr. myagdi Khola N Dobang, 28°42'N, 83°26'E, 2800–3100 m, 22–24 Apr 1995, Martens, Schawaller, 3 ♀ (PBI_OON 15718, PBI_OON 23384) (SMF).

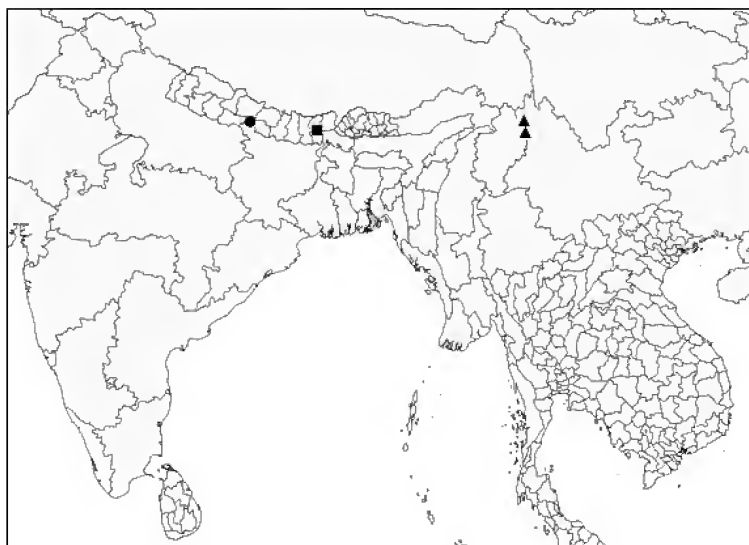
DISTRIBUTION: Known only from West Nepal, the southeast part of the Dhaulagiri massif (map 2).

Camptoscaphiella nepalensis Baehr, new species

Figures 176–178, 198–199, 277–290; map 3

TYPES: Male holotype and female allotype, from Nepal, Parbat Dist., forêt de Goropani entre la vallée de Kali Gandaki et Pokhara in 3100 m, 27.66666°N, 84.41666°E, (8 Oct 1983, I. Loebl, A. Smetana) deposited in MHNG (PBI_OON 15375).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.



MAP 3. Records of *Camptoscapbiella nepalensis* (circle), *C. panchthar* (square) and *C. paquini* (triangles).

DIAGNOSIS: Males resemble those of *C. tubersans* in having a prolateral rim at the distal part of the bulb and those of *C. loebli* in having a broad fusion of the dorsal scute with the epigastric scutum but can easily be recognized by the bulbal tip that is very narrow. Females can be separated from all other species by the large, drop-shaped median plate occupying about $\frac{2}{3}$ of epigastric area and the long copulatory duct with spatulate tip reaching well beyond posterior groove.

MALE (PBI_OON 15375, figs. 277–283): Total length 1.82. Carapace pale orange. Eyes: ALE 0.082, PME 0.046, PLE 0.046; ALE largest; ALE-PLE touching, PME touching throughout most of their length. Sternum, yellow, heart shaped with pointed anterolateral process. Chelicerae, endites, and labium pale orange. Chelicerae straight. Abdomen oval, scutae pale orange. Dorsal scutum covering $\frac{1}{2}$ to $\frac{3}{4}$ of abdomen, more than $\frac{1}{2}$ to most of abdomen width, broadly fused to epigastric scutum. Postepigastric scutum only around epigastric furrow. Epigastric region with large circular sperm pore. Palp (figs. 176–178, 281–283) orange-brown; patella: L, 0.66 mm; P, 0.48 mm; PR = 0.72; H, 0.20 mm; L/H, 3.3; cymbium narrow in dorsal view; bulb distal part with semicircular, prolateral rim, bifurcate ventral appendices and retrolaterally directed fold.

FEMALE (PBI_OON 23385, figs. 284–290): Total length 1.86. As in male except as noted. Eyes: ALE 0.081, PME 0.060, PLE 0.060. Epigastric area with a large, drop-shaped median plate occupying about $\frac{2}{3}$ of epigastric area, a conical anterior sclerite, and a long copulatory duct reaching well beyond posterior groove (figs. 198–199, 289–290).

OTHER MATERIAL EXAMINED: NEPAL: Forêt de Goropani entre la vallée de Kali Gandaki et Pokhara, 27.66666°N, 84.41666°E, 3100 m, 9 Oct 1983, I. Loeb, A. Smetana, 1 ♀ (PBI_OON 15378) (MHNG).

DISTRIBUTION: West Nepal, subtropical broadleaf forest (map 3).

Camptoscaphiella panchthar Baehr, new species

Figures 194–195, 291–300; map 3

TYPE: Female holotype, from Nepal, Panchthar District, Dhorpar Kharka, mature *Rhododendron-Lithocarpus* forest, 2700 m, 27°08'N, 87°54'E (13–16 Apr 1988, J. Martens, W. Schawaller) deposited in SMF (PBI_OON 15771).

ETYMOLOGY: The specific name is a noun in apposition taken from the district of the type locality.

DIAGNOSIS: Females can be separated from all other species by the short, triangular lateral apodemes, a large inverted pear-shaped median plate, a circular anterior sclerite and a long, narrow copulatory duct extending posterior groove, with widened triangular tip (figs. 194–195).

MALE: Unknown.

FEMALE (PBI_OON 15771, figs. 291–300): Total length 1.82. Carapace yellow-brown, lateral margin undulate. Eyes: ALE 0.073; PLE 0.071; PME 0.088; PME largest, ALE circular, PME squared, PLE oval; ALE-PLE separated by less than ALE radius, PME touching throughout most of their length, PLE-PME touching. Sternum, chelicerae, endites, and labium yellow. Abdomen oval, dorsal scutum weakly sclerotized, yellow-brown, covering $\frac{1}{2}$ to $\frac{3}{4}$ of abdomen, between $\frac{1}{4}$ and $\frac{1}{2}$ abdomen width, not fused to epigastric scutum. Epigastric scutum and post-epigastric scutum weakly sclerotized, yellow-brown. Leg femur I with two prolateral spines. Epigastric area with large pear-shaped median plate and circular thornlike anterior sclerite; copulatory duct narrow, long, extending posterior groove, with widened triangular tip, apodemes short, triangular, not reaching posterior groove (figs. 194–195, 300).

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: East Nepal (map 3).

Camptoscaphiella paquini Ubick, new species

Figures 1–160, 179–181, 196–197, 301–324; map 3

TYPES: Male holotype and female allotype, from China, on stable scree slope on soil at Li-shadi, 500 m before Shibali Yaku (Pass #31), 3585 m, 27.21354°N, 98.70021°E, Yunnan Province (7 Aug 2005, P. Paquin, PP2405, CASENT 9022602) deposited in HNU (PBI_OON03638).

ETYMOLOGY: The specific name is a patronym in honor of Pierre Paquin, who collected the type series and majority of the known specimens.

DIAGNOSIS: The male of this species differs from all congeners except *C. schwendingeri* in having a palpal bulb that lacks a distinct conductor, and from *C. schwendingeri* in having a much smaller embolar region (figs. 139–145, 179–181). The female differs from all other *Camptoscaphiella* in having genitalia with a sinuous copulatory duct (figs. 154–159, 197, 323, 324).

MALE (PBI_OON 02187, figs. 301–310): Total length 2.00. Carapace yellow-brown, surface and sides of pars cephalica very finely striated, lateral margin undulate. Clypeus straight in front view, sloping forward in lateral view; setae dark. Eyes: ALE largest, ALE oval, PME

squared, PLE oval; posterior eye row procurved from both above and front; ALE-PLE touching, PME touching for less than half their length. Sternum as long as wide, yellowish white, not fused to carapace, with weak radial furrows between coxae I–II, II–III, III–IV, furrows wrinkled, surface smooth, anterior margin with continuous transverse groove, posterior margin extending posteriorly beyond anterior edges of coxae IV as single extension, lateral margins unmodified, male sternum with a pair of rounded anterolateral processes; setae abundant, dark, originating from surface. Mouthparts: chelicerae, endites, and labium pale orange. Chelicerae straight; promargin with one small tooth; setae dark, evenly scattered; paturon promargin with row of flattened setae. Labium broadly triangular; with 6 or more setae on anterior margin, subdistal portion with unmodified setae. Endites distally excavated, serrula present in single row, anteromedian margin a truncate lobe bearing dense brush of broad setae. Abdomen: pedicel ribbed. Dorsal scutum moderately sclerotized, yellow-brown, covering about $\frac{1}{2}$ of abdomen, between $\frac{1}{4}$ and $\frac{1}{2}$ abdomen width, fused to epigastric scutum, postepigastric scutum pale orange, short, covering about $\frac{1}{3}$ of the abdominal length, posteriorly rounded. Spinneret scutum present, incomplete ring; with fringe of needlelike setae. Spinnerets: colulus represented by 2 setae; ALS with 3 spigots, a larger median one surrounded by 2 smaller ones (pyriform); PMS with 2 subequal spigots; PLS with 4 subequal spigots. Dorsum setae dark. Epigastric area dark. Postepigastric area setae dark. Legs: yellow-brown, tibiae with circular depressions on the cuticle that lack visible pores and probably represent regions of muscle attachment. Tarsi I to IV superior claws examined in detail; all surfaces striated; proclaws and retroclaws I–III each with 3 subapical teeth along outer margin; proclaw IV with 2 basal teeth; retroclaw IV with 4 teeth; teeth actually originate from the ventral surface and bend outwards; inner margins without apparent teeth. Trichobothria examined with SEM; hairs plumose, hood with fine striations, base with longitudinal slit, aperture not grate-like. Tarsal organ of palp round with 1 large and 1 medium-sized sensilla; tarsal organ of legs I–II an irregular oval, with 2 large and 1 small sensilla. Epigastric region with sperm pore large, oval, rebordered; with 1 pair of additional orifices mesad of booklung openings (figs. 48–51). Palp not strongly sclerotized, proximal segments red-brown; trochanter normal size; femur one to two times as long as trochanter; patella greatly elongate, longer than other segments combined, tibia and tarsus rounded, subequal, cymbium orange-brown, ovoid in dorsal view; bulb orange-brown, stout, tapering apically, without distinct ventral conductor.

FEMALE (PBI_OON 3056, figs. 311–324): Total length 2.32. As in male except as noted. Carapace brown, anteriorly narrowed to between 0.50 and 0.75 times its maximum width; marginal setae light. Eyes subequal. Sternum yellow-brown, lacking anterior transverse groove (embolarium), lacking anterolateral process. Endites without distal excavation, anteromedian margin lacking lobe or strongly modified setae. Abdomen oval, dorsal scutum covering less than $\frac{1}{2}$ of abdomen, not fused to epigastric scutum. Epigastric scutum strongly sclerotized. Postepigastric scutum strongly sclerotized, widely hexagonal, only around epigastric furrow, with short posteriorly directed lateral apodemes, hollow basally and with external opening (fig. 152). Spinnerets: colulus represented by 2 setae; ALS with 4 spigots, a larger median one surrounded by 3 smaller ones (pyriform); PMS with 5–6 subequal spigots; PLS with 9 subequal spigots. Legs: orange-brown; shorter than in male. Tarsal claws as in male, except that female

retroclaw IV has only 2 subapical teeth (4 in male). Trichobothria as in male. Tarsal organ I and II large and rounded, with 2 large and 1 small sensilla; tarsal organ of palp, III, and IV small and oval, with 1 large and 1 small sensilla.

NOTES: The copulatory duct of *C. paquini* is strongly sinuous and somewhat distinct from the straight to slightly curved duct found in all other *Camptoscaphiella*. At first glance this suggests that the female may be misplaced and would better fit in *Ischnothyreus*, which is somatically similar and where sinuous ducts are common. Apart from the fact that *C. paquini* males and females were collected together, a closer comparison with a true *Ischnothyreus*, also from western Yunnan Province, has turned up additional differences between the two genera. In *C. paquini*, the copulatory duct opens externally at its anterior end through a small longitudinal slit (fig. 150), and is similar to other *Camptoscaphiella* that have been closely examined (as in Brignoli, 1976: figs. 1–2). In *Ischnothyreus*, the copulatory duct opens to the outside at its posterior end through a larger opening and (at least in the Yunnan species) has additional invaginations anteriorly (figs. 325, 326, arrow). Thus, it seems reasonable that the female of *C. paquini* is, indeed, a *Camptoscaphiella*, albeit one with a unique morphology. In fact, the morphological uniqueness of the female *C. paquini*, is also shared by the male that, in contrast to most other species, has a much smaller embolar region and lacks a separate ventral prong (“conductor”). A conductor is also apparently absent in *C. schwendingeri*, which suggests relationship, a possibility that can be tested when females of that species are discovered.

OTHER MATERIAL EXAMINED: **CHINA:** Yunnan Province: Lishadi, 500 m before Shibali Yaku (Pass #31), 3585 m, 27.21354°N, 98.70021°E, stable scree slope on soil, 7 Aug 2005, P. Paquin, PP2405, 2♂ (PBI_OON 02187, CASENT 9022603, CAS), 1♀ (PBI_OON 003046, CASENT 9022605, HNU); Lishadi, 10 km W Shibali, 3221 m, 27.20055°N, 98.71399°E, mature pine forest with bamboo understory, under rocks and logs, 6 Aug 2005, P. Paquin, PP2305, 1♀ (PBI_OON 003056, CASENT 9022537, HNU); 6.18 km 280° W Shibali, 3100 m, 27.18413°N, 98.72024°E, turning rocks in open meadow along stream, 7 May 2004, C. Griswold, D. Kavanaugh, CGY35, 1♀ (PBI_OON 36310, CASENT 9020666, CAS); 7.41 km 315° WNW Shibali, 36.0 km 325° NNW Fugong, 3336 m, 27.20629°N, 98.72001°E, beneath objects amidst dormant bamboo, along snowfield and avalanche debris, 8 May 2004, C. Griswold, D. Kavanaugh, CGY39, 1♀ (PBI_OON 36312, CASENT 9019944, CAS); 1♀ (PBI_OON 36311, CASENT 9019943, HNU); Lishadi, 1 km before Shibali Yaku (Pass #31), 3585 m, 27.21447°N, 98.70064°E, talus slope atop alpine meadow, 12 Aug 2005, P. Paquin, PP3405, 1♂, 1 juvenile (PBI_OON 003058, CASENT 9023117, HNU); Lumadeng, Lao Shibali pass (pass #30), 3265–3060 m, 27.06427°N, 98.75123°E, rock cliffs along the road, 13 Aug 2005, P. Paquin, PP3705, 1♀ (PBI_OON 003053, CASENT 9022533, CAS); Lishadi, 10.5 km W of Shibali, 3250 m, 27.20192°N, 98.71321°E, rhododendron patch in conifer forest, in wet leaf litter, 17 Aug 2005, P. Paquin, PP4205, 2♀ (PBI_OON 003054, CASENT 9022547, CAS); 1♀ (PBI_OON 003059, CASENT 9022548, HNU); Yakou of Shibali, 3615 m, 27.21234°N, 98.69601°E, 5–7 Aug 2005, T. Guo, TG0503, 1♂ (PBI_OON 003057, CASENT 9025931, CAS); 41 km W Gongshan on Dulong Valley Rd, 3000 m, 27.79655°N, 98.50562°E, 27 Sep–6 Oct 2002, D. Kavanaugh, P. Marek, D. Dong, H. Liang, DHK2002031A, 1♀ (PBI_OON 003049, CASENT 9030686, CAS).

DISTRIBUTION: Known only from the Gaoligongshan region in westernmost Yunnan Province, China (map 3).

Camptoscaphiella schwendingeri Baehr, new species

Figures 173–175, 327–335; map 4

TYPE: Male holotype, from Thailand, Amphoe Mae Sai Co., Changwat Chian Rai, Tharn (Cave) Pla, 1120 m, 20.33333°N, 99.86666°E (21 Jun 1986, P.L. Stone), deposited in RMNH (PBI_OON 23365).

ETYMOLOGY: The specific name is a patronym in honor of Peter Schwendinger who surveyed the soil-dwelling arthropod fauna of Southeast Asia for many years and who collected a specimen of this species.

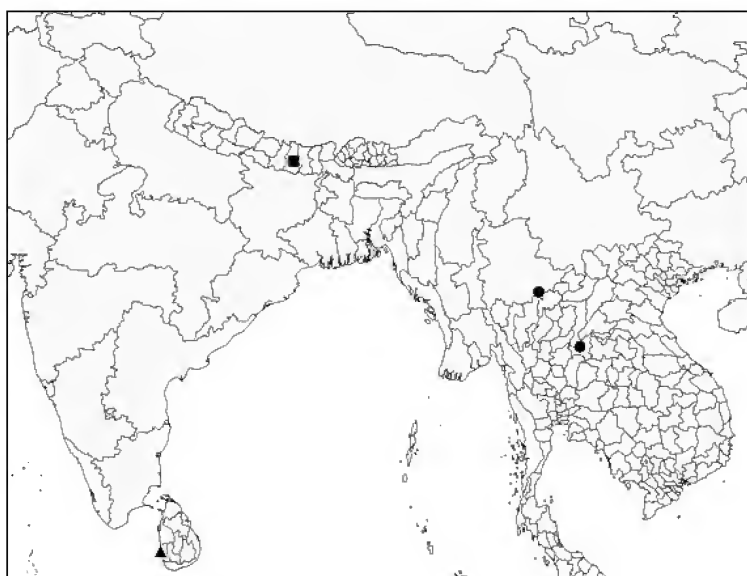
DIAGNOSIS: Males can be easily recognized by the carapace with dark brown median stripe and the distal part of bulb with two wing-shaped appendices, median one twice as long as lateral one.

MALE (PBI_OON 23365, figs. 327–335): Total length 1.47. Carapace pale orange, pars cephalica domed in lateral view, with longitudinal brown stripe medially. Sternum, chelicerae, endites and labium pale orange. Abdomen: scutae pale orange; dorsal scutum covering about $\frac{1}{2}$ of abdomen length, between $\frac{1}{4}$ and $\frac{1}{2}$ abdomen width, not fused to epigastric scutum; post-epigastric scutum, short, only around epigastric furrow. Palp (figs. 173–175, 333–335) red-brown; patella: L, 0.49 mm; P, 0.30 mm; PR, 0.61; H, 0.14 mm; L/H, 3.5; cymbium yellow-brown, ovoid in dorsal view; bulb pale orange, distal part with 2 wing-shaped appendices; median one twice as long as lateral one and retrolateral directed fold.

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: **THAILAND:** Loei Province: Phu Rua District: Phu Rua National Park, 1230 m, 17.50000°S, 101.50000°E, Dec. 20, 1994, P. Schwendinger, 1 ♂ (MHNG PBI_OON 15490).

DISTRIBUTION: Middle and northern Thailand (map 4).



MAP 4. Records of *Camptoscaphiella schwendingeri* (circles), *C. silens* (square) and *C. simoni* (triangle).

Camptoscaphiella silens Brignoli

Figures 272–276; map 4

Camptoscaphiella silens Brignoli, 1976: 233, figs. 2–4, 6 (♀).

TYPE: Female holotype (PBI_OON 23389), from Nepal, southern Surkya, near Puiyan, between Khorila and Bayao Khola, 2700–3000 m, in forested ravine (27 Apr 1961, H. Janetschek), deposited at the Zoological Institute Innsbruck, Austria, examined.

DIAGNOSIS: The female of this species most closely resembles *C. fulva* in having a short copulatory duct, but differs in having the copulatory opening closer to the epigastric furrow (fig. 276; Brignoli, 1976: figs. 2, 6).

DISTRIBUTION: Nepal (map 4).

Camptoscaphiella simoni Baehr, new species

Figures 167–169, 336–342; map 4

Ischnothyreus peltifer, Simon, 1893: 299, fig. 264 (♂), misidentification.

TYPE: Male holotype, Museum Paris AR 5730, identified as 2702 *Ischnothyreus peltifer* E. S. Ceylon.

ETYMOLOGY: The specific name is a patronym in honor of Eugène Simon, who misidentified this species as *Ischnothyreus peltifer* (Simon, 1891), in his paper from 1893 in which a drawing of the male palp was published.

DIAGNOSIS: Males can easily be recognized by the ventrally greatly bulged bulb and the inverted T-shaped distal end in dorsal view (fig. 168).

MALE (PBI_OON 23343, figs. 336–342): Total length 1.41. Carapace, sternum, chelicerae, endites, and labium pale orange. Eyes all subequal; ALE-PLE separated by less than ALE radius, PME touching throughout most of their length. Chelicerae slightly divergent; Abdomen: dorsal scutum pale orange, covering more than $\frac{3}{4}$ of abdomen length, more than $\frac{1}{2}$ to most of abdomen width, not fused to epigastric scutum, middle surface finely reticulate, sides finely reticulate; postepigastric scutum pale orange, almost rectangular, covering about $\frac{3}{4}$ of abdominal length. Legs: yellow; patella plus tibia I near as long as carapace. Palp pale orange; patella: L, 0.37; P, 0.23; C, 0.62; H, 0.13; L/ H, 2.8; bulb ventrally greatly bulged bulb and the inverted T-shaped distal end in dorsal view and broad retrolaterally directed fold (figs. 167–169, 340–342).

FEMALE: Unknown.

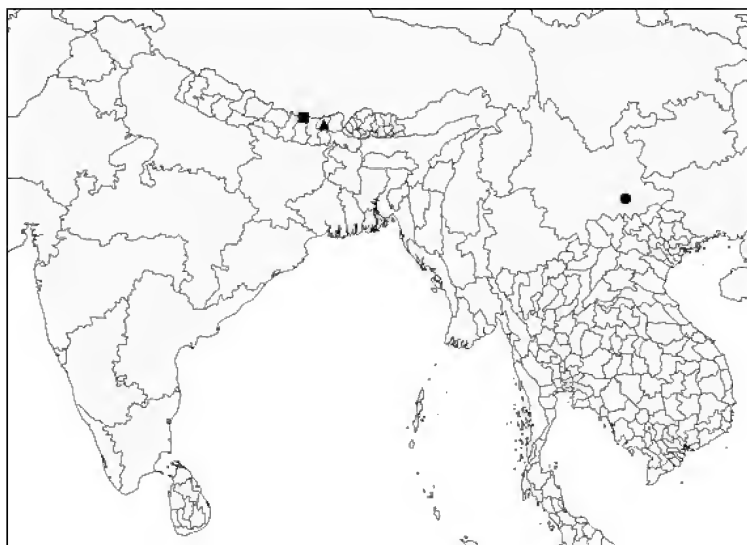
OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Sri Lanka (map 4).

Camptoscaphiella sinensis Deeleman-Reinhold

Map 5

Camptoscaphiella sinensis Deeleman-Reinhold, 1995: 26, figs. 1–5 (♂ ♀); Song et al., 1999: 68, fig. 27J–K (♂ ♀).



MAP 5. Records of *Camptoscaphiella sinensis* (circle), *C. strepens* (square) and *C. taplejung* (triangle).

TYPES: Male holotype, female paratype, two juveniles, from China, Yunnan Province, Menzi County, in cave near the footpath to the plateau (5 Jan 1989, P. Beron), type depository not specified, not examined.

DIAGNOSIS: This species differs from all others in the genus in lacking eyes, femoral spines, and abdominal dorsal scuta.

NOTE: The internal female genitalia have not been examined.

DISTRIBUTION: China (map 5).

Camptoscaphiella strepens Brignoli

Figures 267–271; map 5

Camptoscaphiella strepens Brignoli, 1976: 232, figs. 1, 5 (♀).

TYPE: Female holotype, from Nepal, Yawal, near Pangpoche, “Zwergstrauchheide auf Schwemmkegel und Löss (im Formolfalle),” 3900 m (3–29 May 1961, H. Janetschek), deposited at the Zoological Institute Innsbruck, Austria, not examined.

DIAGNOSIS: The female of this species most closely resembles that of *C. nepalensis*, from which it may be distinguished by a more angular median epigynal area (Brignoli, 1976: figs. 1, 5).

MATERIAL EXAMINED: **NEPAL:** Yawal, near Pangpoche, “Zwergstrauchheide auf Schwemmkegel und Löss (im Formolfalle),” 3900 m, 3–29 May 1961, H. Janetschek, 1 ♀ paratype (PBI_OON 23388, ZII).

DISTRIBUTION: Nepal (map 5).

Camptoscaphiella taplejung Baehr, new species

Figures 188–189, 343–352; map 5

TYPE: Female holotype, from Nepal, Taplejung District, ridge Lasse Dhara and pasture Lassetham NW of Yamputhin, 3000 m, 27°29'N, 87°51'E (6–7 Sep 1983, J. Martens, B. Daams), deposited in SMF (PBI_OON 15760).

ETYMOLOGY: The specific name is a noun in apposition taken from the district of the type locality.

DIAGNOSIS: Females can be separated from all other species by epigastric area with a large, almost square median plate and a small thornlike anterior sclerite close to epigastric fold and a long, narrow sinuous copulatory duct with broadened tip reaching far beyond posterior groove.

MALE: Unknown.

FEMALE (PBI_OON 15760, figs. 343–352): Total length 1.79. Carapace yellow-brown, lateral margin undulate. Eyes: ALE 0.090; PME 0.079; PLE 0.085, ALE largest, ALE circular, PME squared, PLE oval; posterior eye row procurved from both above and front; ALE-PLE touching, PME touching throughout most of their length, PLE-PME touching. Sternum chelicerae, endites, and labium yellow. Abdomen oval, dorsal scutum yellow-brown, covering $\frac{1}{2}$ to $\frac{3}{4}$ of abdomen, more than $\frac{1}{2}$ to most of abdomen width, not fused to epigastric scutum. Epigastric and postepigastric scutum yellow-brown, widely hexagonal, only around epigastric furrow. Legs: femur I with 2 prolateral spines. Epigastric area with large, almost square median plate and thornlike anterior sclerite; copulatory duct long, narrow, sinuous with broad tip reaching far beyond posterior groove (figs. 188–189, 352).

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: East Nepal south of the Kanchenjunga massif (map 5).

Camptoscaphiella tuberans Tong and Li

Map 2

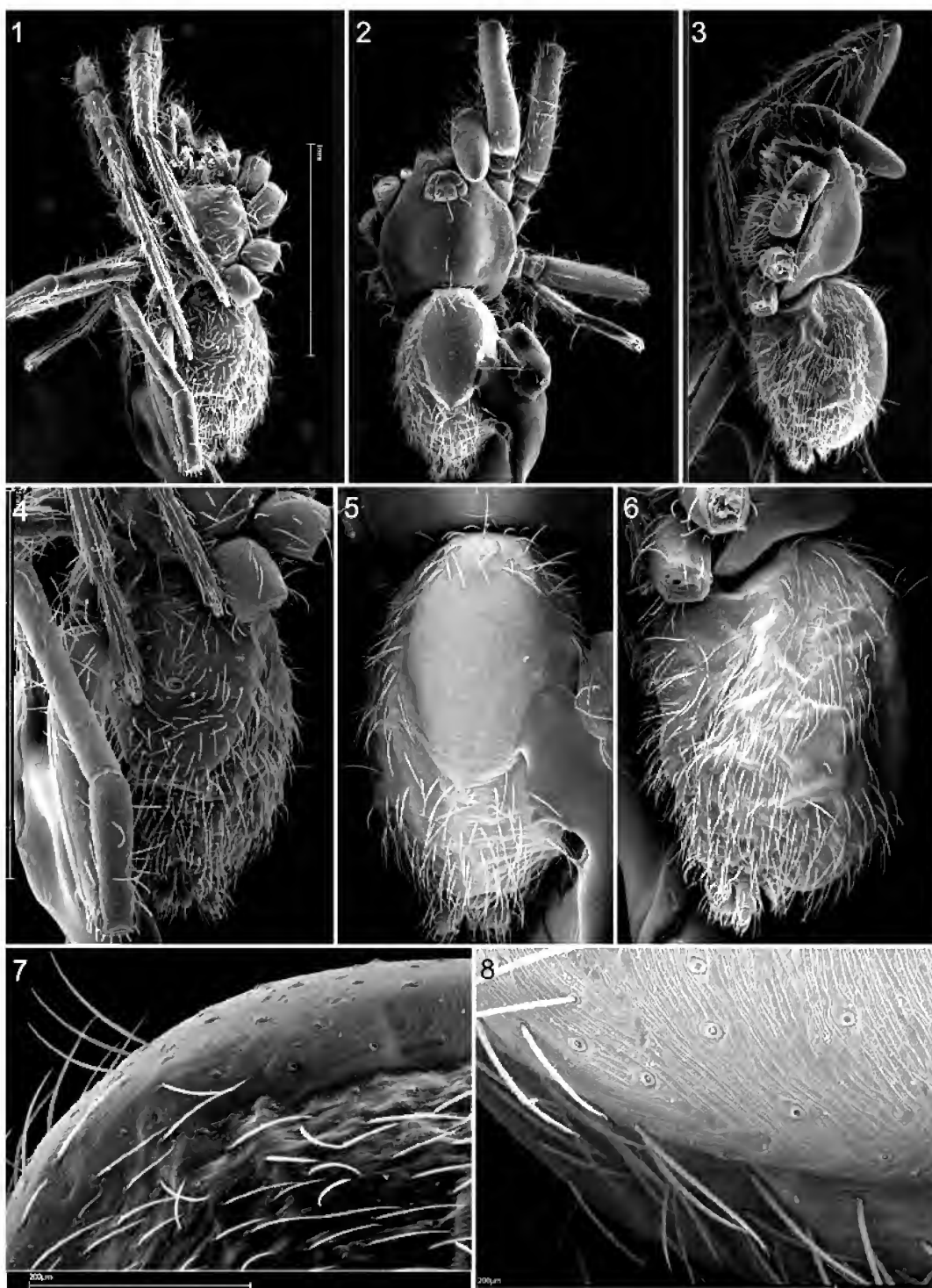
Camptoscaphiella tuberans Tong and Li, 2007: 335, figs. 19–27 (♂ ♀).

TYPES: Male holotype, three male and six female paratypes, from China, Yunnan Province, Deqen, Mt. Moirigkawagarbo, 28°28'N, 98°47'E, 2372 m (30 Jul 2006, Yanjing Song, Zhihui Cui, Jianju Xu), deposited at the Institute of Zoology, Chinese Academy of Sciences (IZCAS) in Beijing, China, not examined.

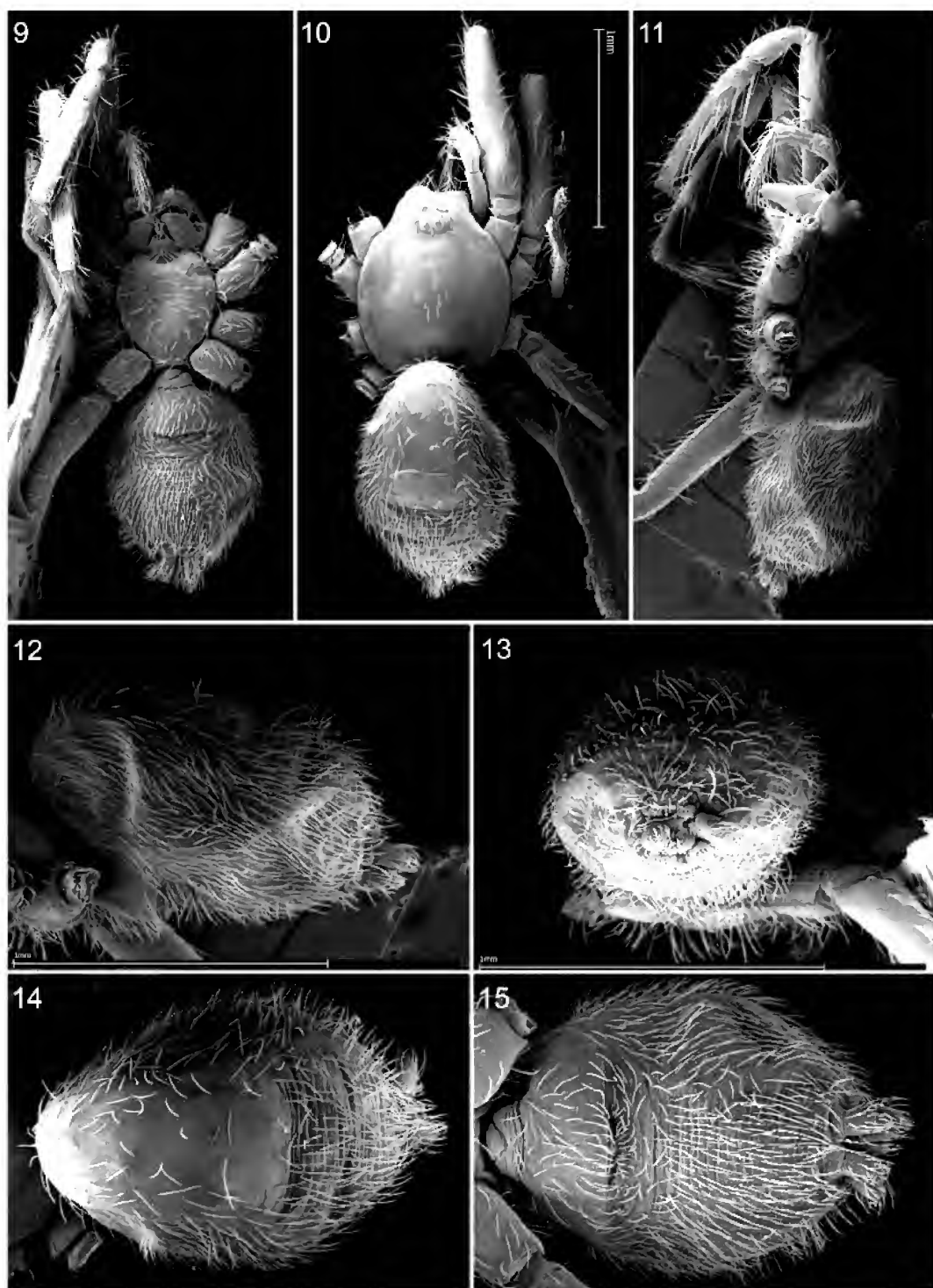
DIAGNOSIS: The male of *C. tuberans* differs from other *Camptoscaphiella* in having a conductor divided into two subequal prongs (Tong and Li, 2007: figs. 24, 26, 27). The female most closely resembles *C. panchthar* in the shape of the copulatory duct and in having short apodemes, and differs from that species in having a round (as opposed to pyriform) median plate (Tong and Li, 2007: fig. 24).

NOTES: This species appears to be well described and illustrated by Tong and Li (2007).

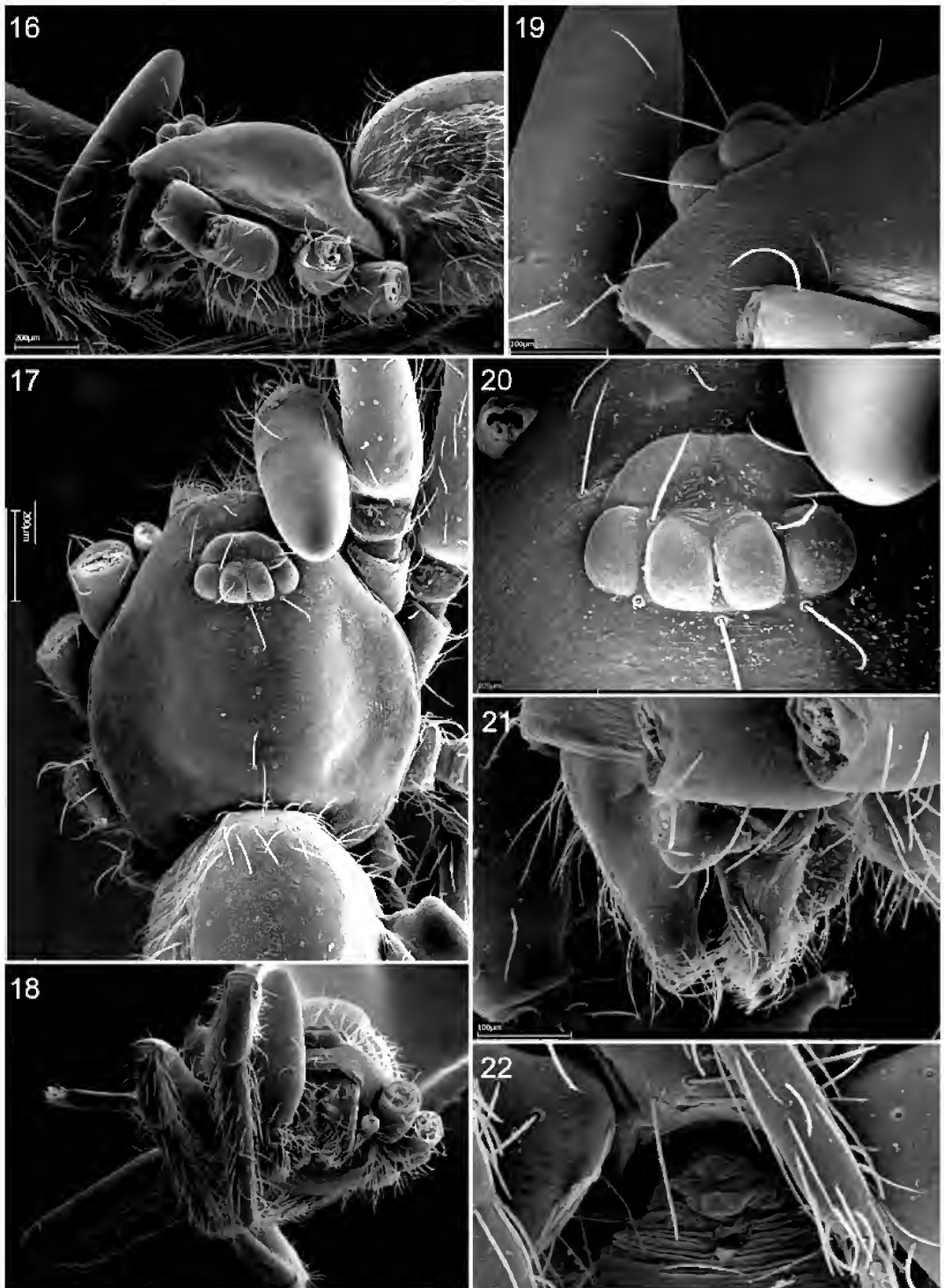
DISTRIBUTION: China (map 2).



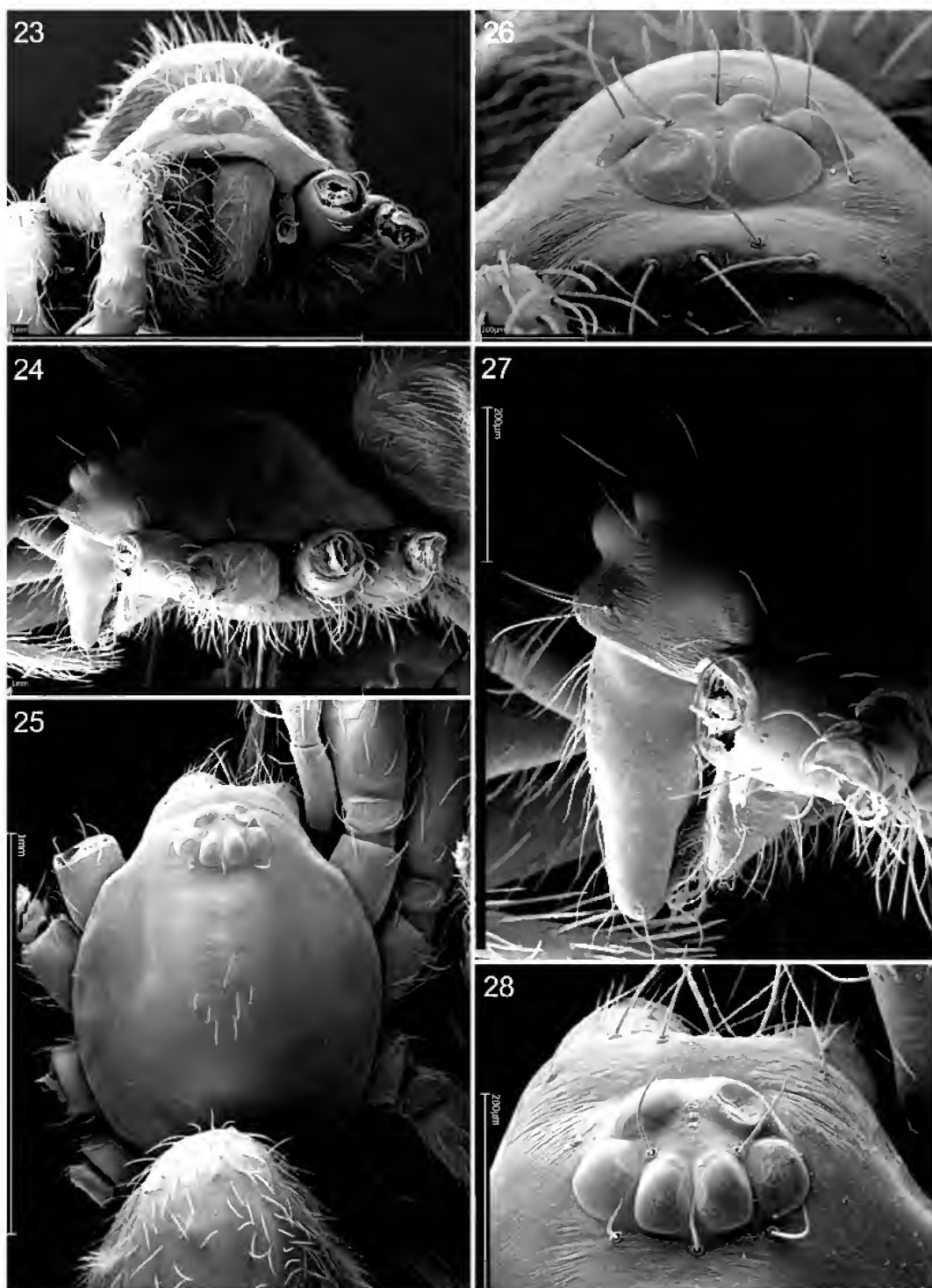
FIGURES 1–8. *Camptoscaphiella paquini*, new species, male (PBI_OON 02187). 1. Habitus, ventral view. 2. Same, dorsal view. 3. Same, lateral view. 4. Abdomen, ventral view. 5. Same, dorsal view. 6. Same, lateral view. 7. Dorsal scutum, lateral view. 8. Same, dorsal view.



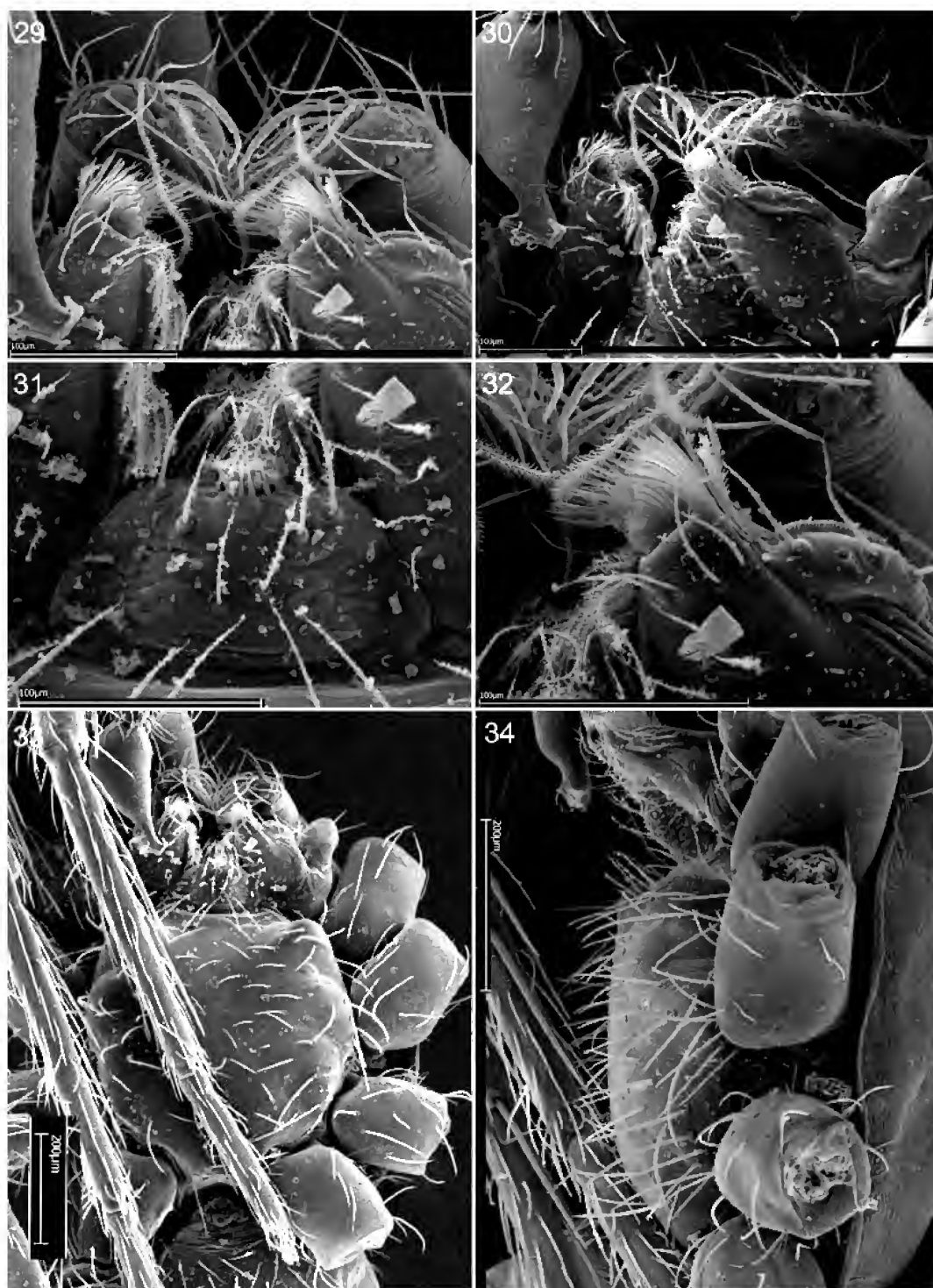
FIGURES 9–15. *Camptoscaphiella paquini*, new species, female (PBI_OON 03056). 9. Habitus, ventral view. 10. Same, dorsal view. 11. Same, lateral view. 12. Abdomen, lateral view. 13. Same, posterior view. 14. Same, dorsal view. 15. Same, ventral view.



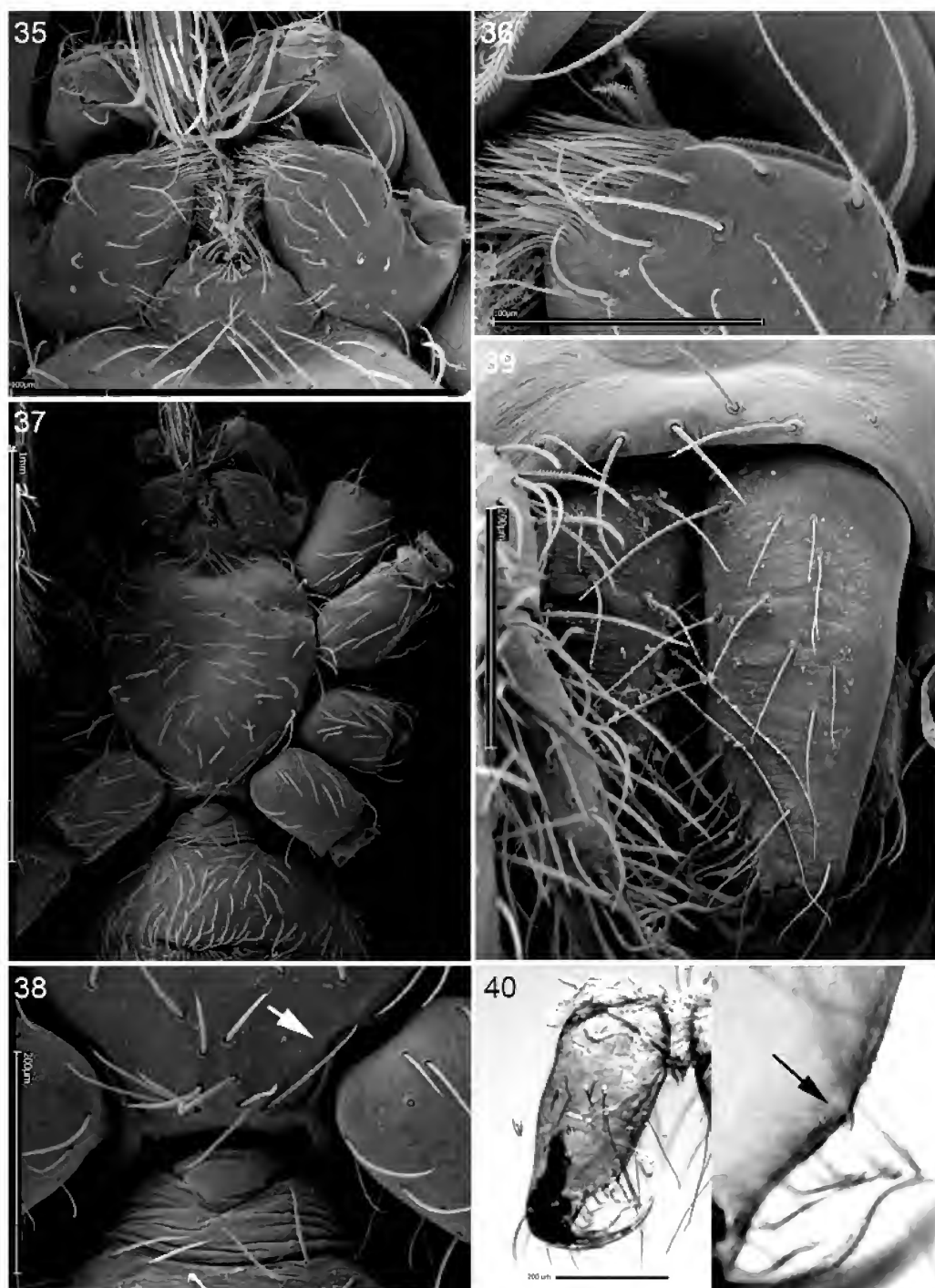
FIGURES 16–22. *Camptoscaphiella paquini*, new species, male (PBI_OON 02187). 16. Cephalothorax, lateral view. 17. Same, dorsal view. 18. Same, anterior view. 19. Eye region, lateral view. 20. Same, dorsal view. 21. Chelicerae and mouthparts, lateral view. 22. Pedicel region, ventral view.



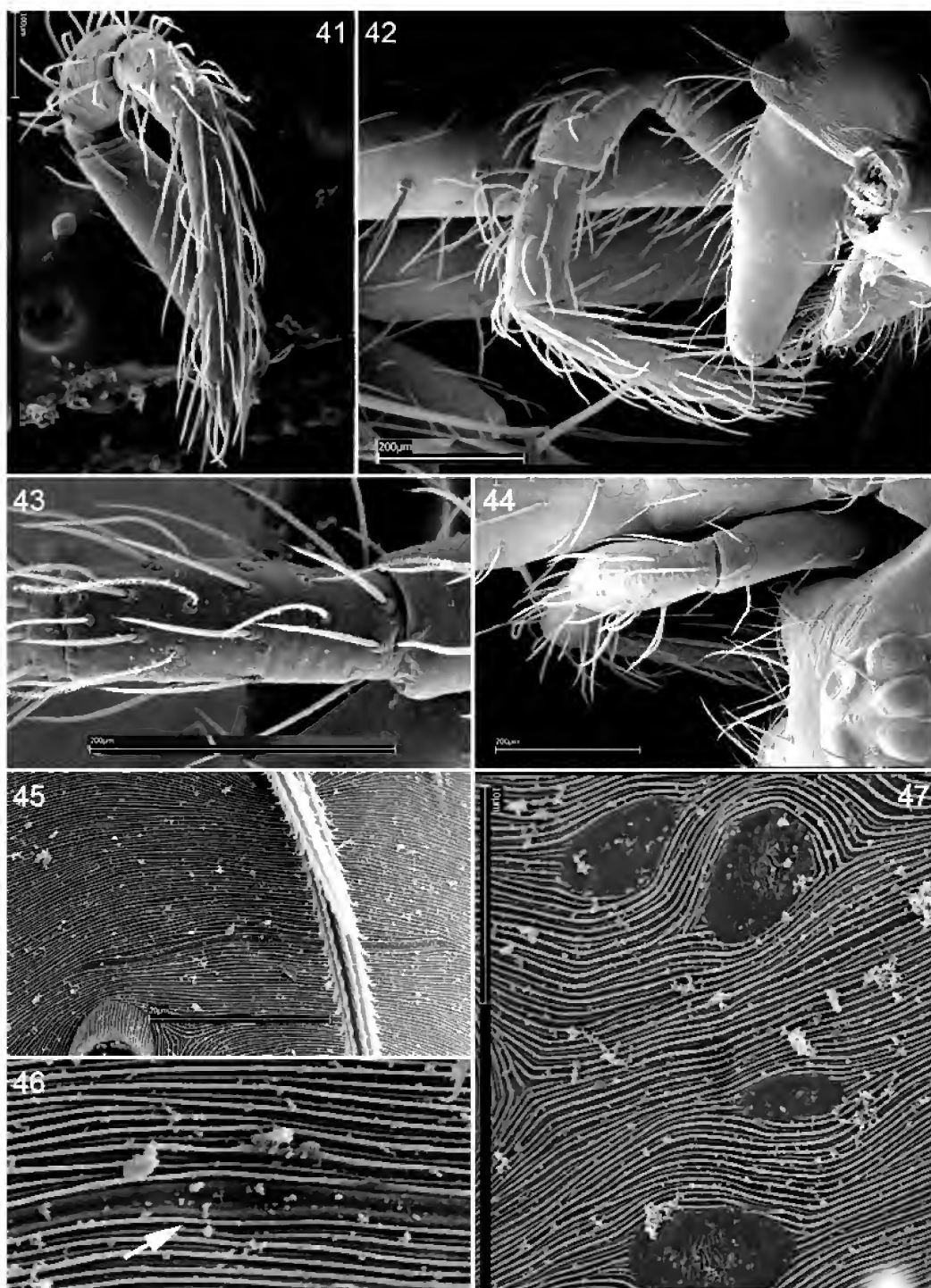
FIGURES 23–28. *Camptoscaphiella paquini*, new species, female (PBI_OON 03056). 23. Cephalothorax, anterior view. 24. Same, lateral view. 25. Same, dorsal view. 26. Eye region, anterior view. 27. Same, lateral view. 28. Same, dorsal view.



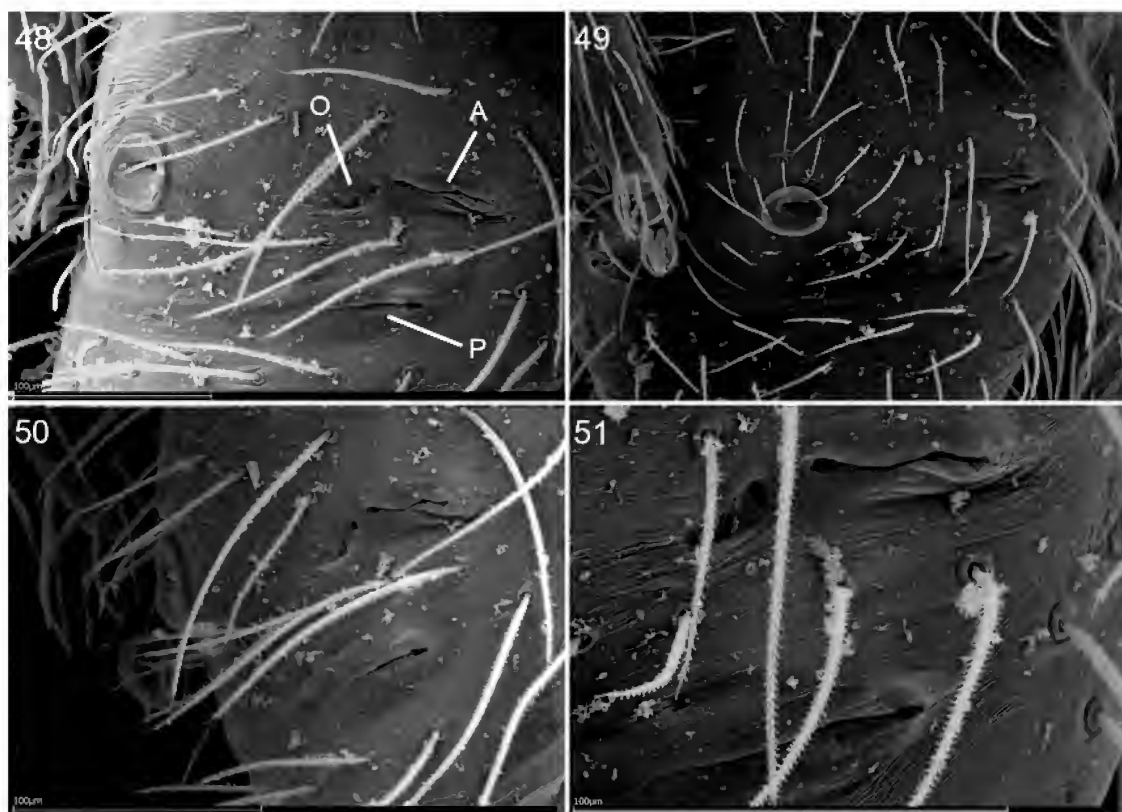
FIGURES 29–34. *Camptoscaphiella paquini*, new species, male (PBI_OON 02187). 29. Chelicerae and mouthparts, ventral view. 30. Same, sublateral view. 31. Labium, ventral view. 32. Endite distal end, ventral view. 33. Cephalothorax, ventral view. 34. Same, lateral view.



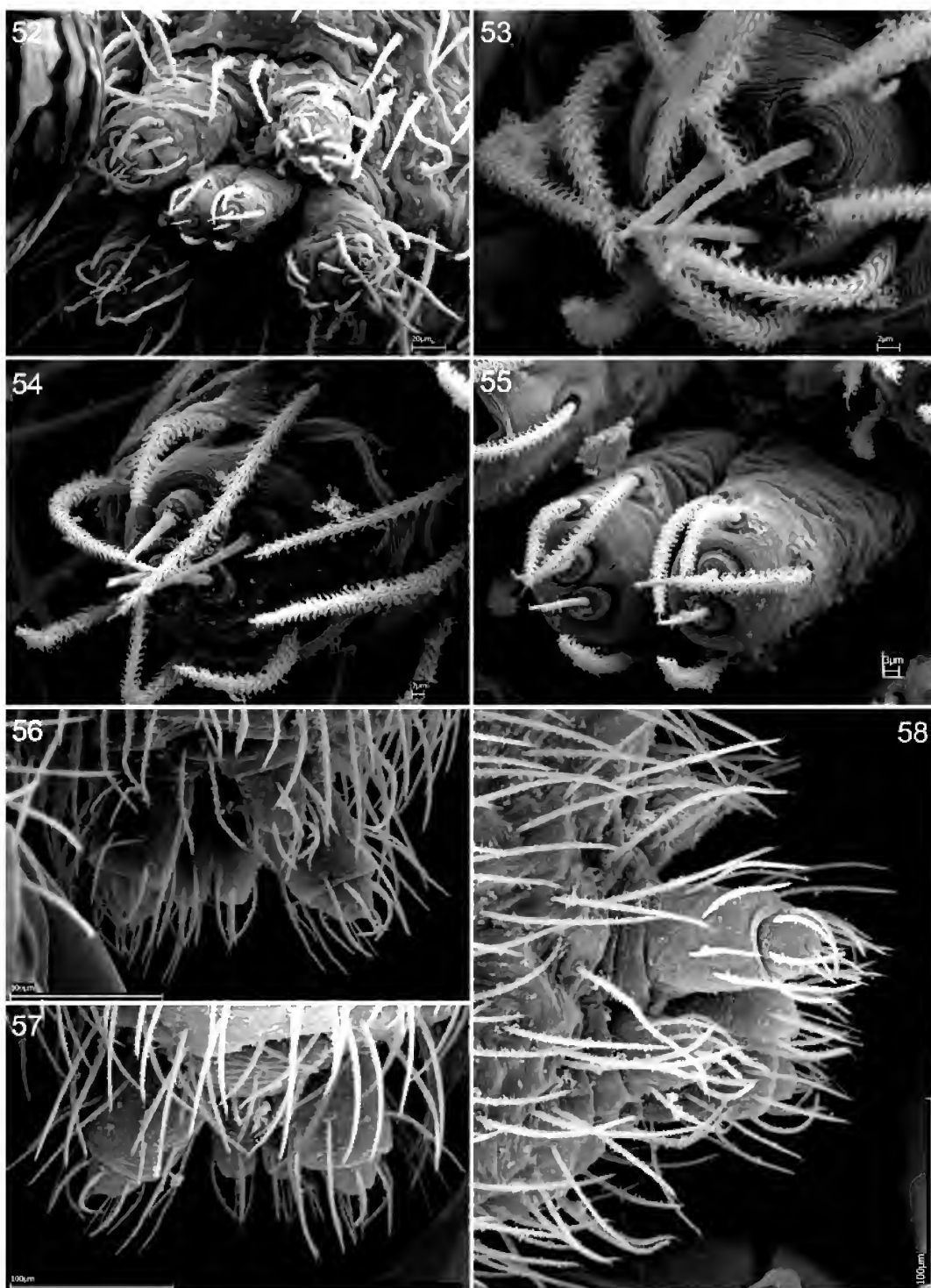
FIGURES 35–40. *Camptoscapchiella paquini*, new species, female (PBI_OON 03056: 35–39; PBI_OON 03053: 40). 35. Chelicerae and mouthparts, ventral view. 36. Endite distal end, ventral view. 37. Cephalothorax, ventral view. 38. Pedicel region, ventral view, with arrow to coxal groove. 39. Chelicerae, anterior view. 40. Left chelicerae, posterior view, with enlargement showing promarginal tooth (arrow).



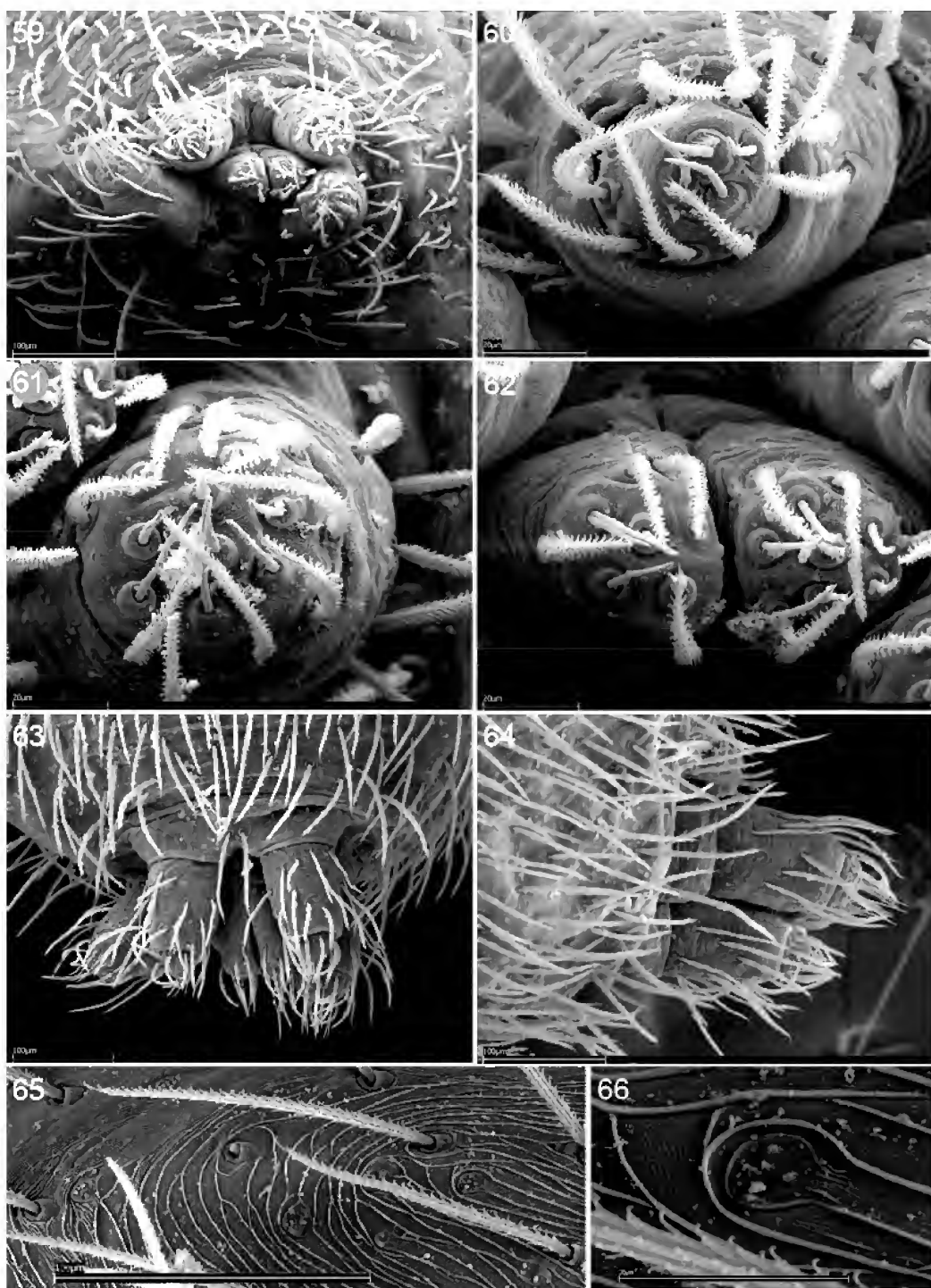
FIGURES 41–47. *Camptoscaphiella paquini*, new species, female (PBI_OON 03056). 41. Left palp, anterior view. 42. Right palp, prolateral view. 43. Palpal tibia, dorsal view. 44. Palp, dorsal view. 45. Tibia I, dorsal view, showing slit sensillum. 46. Same, magnified view, with arrow to pore. 47. Tibia I, dorsal view, showing probable muscle scars.



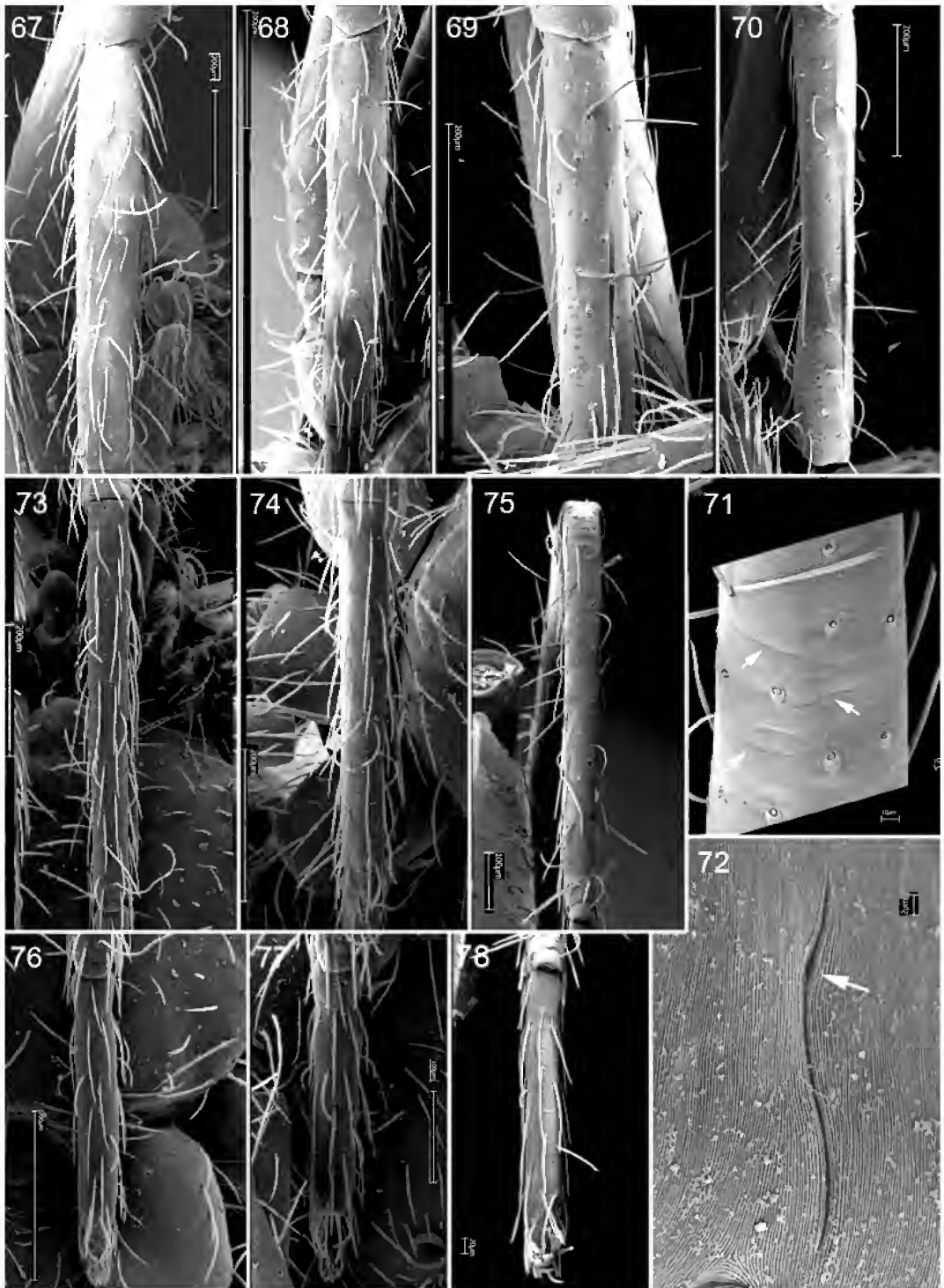
FIGURES 48–51. *Camptoscaphiella paquini*, new species, male (PBI_OON 02187). 48. Epigastric area, ventrolateral view, showing anterior (A) and posterior (P) respiratory spiracles in relation to additional orifice (O). 49. Same, ventral view. 50. Same, lateral view. 51. Same, enlarged view of spiracle region.



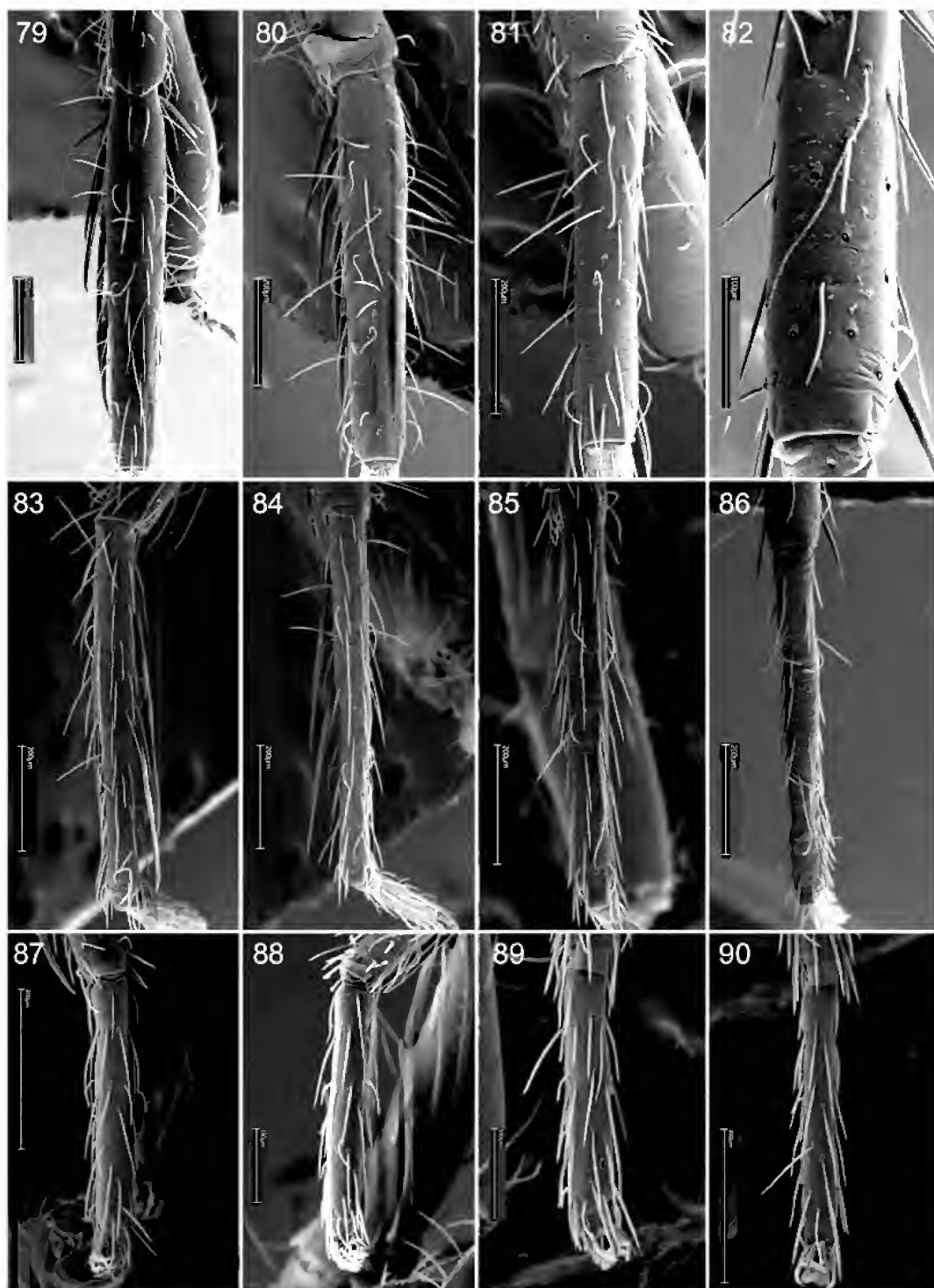
FIGURES 52–58. *Camptoscaphiella paquini*, new species, male (PBI_OON 02187). 52. Spinnerets, posterior view. 53. ALS, posterior view. 54. PLS, posterior view. 55. PMS, posterior view. 56. Spinnerets, ventral view. 57. Same, dorsal view. 58. Same, lateral view.



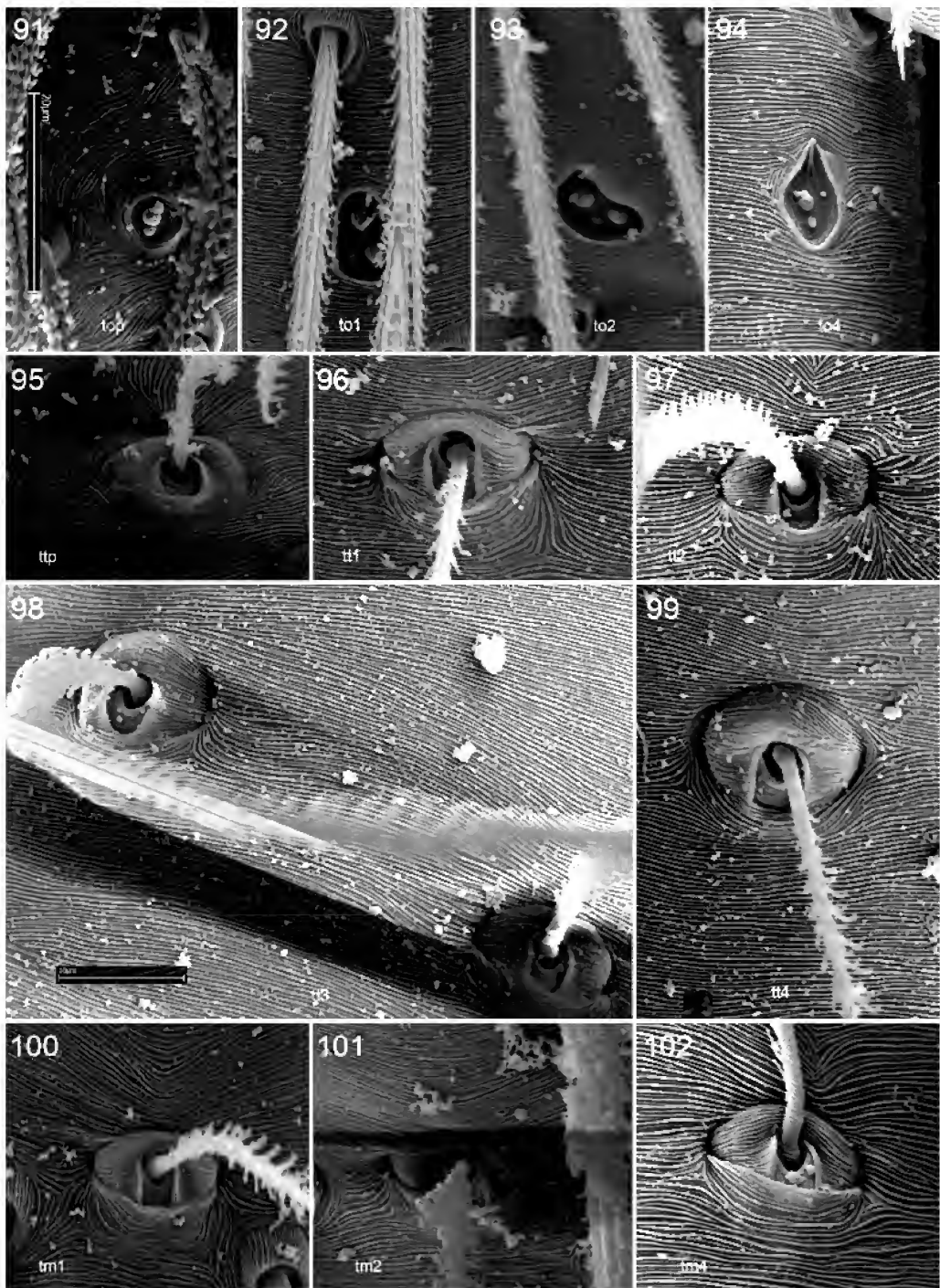
FIGURES 59–66. *Camptoscaphiella paquini*, new species, female (PBI_OON 03056). 59. Spinnerets, posterior view. 60. ALS, posterior view. 61. PLS, posterior view. 62. PMS, posterior view. 63. Spinnerets, ventral view. 64. Same, lateral view. 65. Abdomen, dorsal view, showing posterior edge of dorsal scutum. 66. Same, magnified view of cuticle structure.



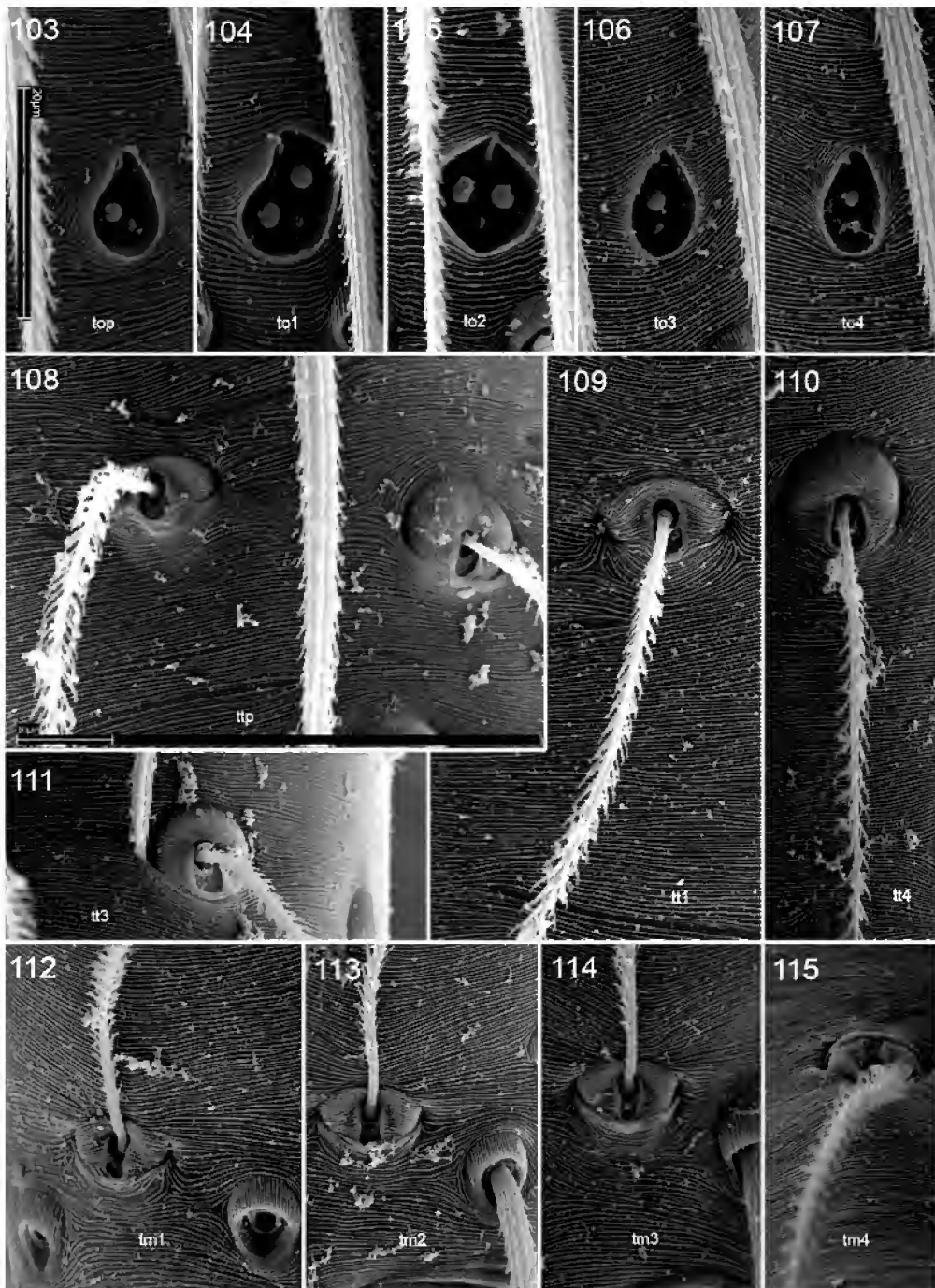
FIGURES 67–78. *Camptoscaphiella paquini*, new species, male (PBI_OON 02187), leg segments, dorsal views. 67. Tibia I. 68. Tibia II. 69. Tibia III. 70. Tibia IV. 71. Tibia IV, magnified to show slit sensilla (arrows). 72. Same, showing single sensillum (rotated) with arrow to pore. 73. Metatarsus I. 74. Metatarsus II. 75. Metatarsus IV. 76. Tarsus I. 77. Tarsus II. 78. Tarsus IV.



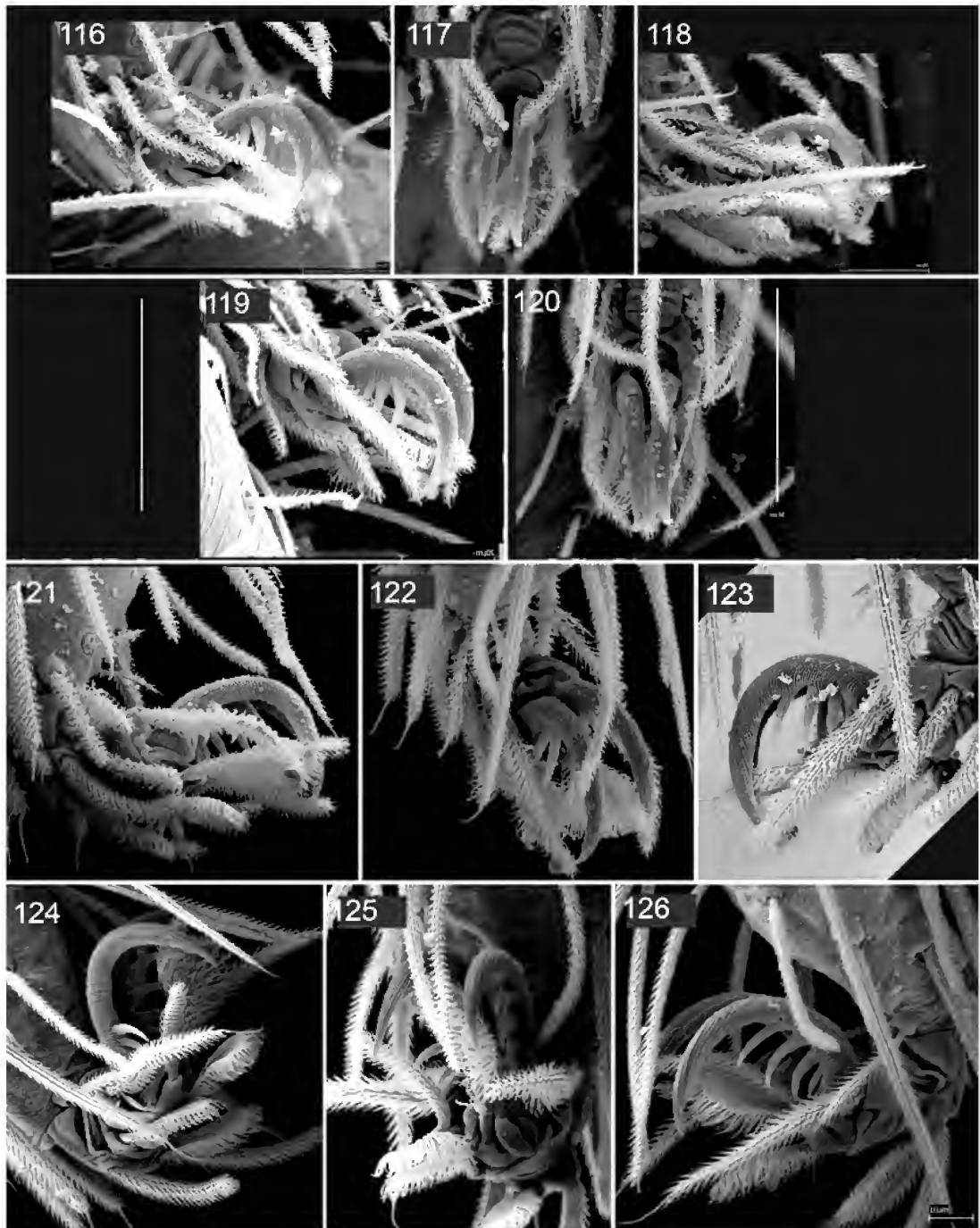
FIGURES 79–90. *Camptoscapbiella paquini*, new species, female (PBI_OON 03056), leg segments, dorsal views. 79. Tibia I. 90. Tibia II. 81. Tibia III. 82. Tibia IV. 83. Metatarsus I. 84. Metatarsus II. 85. Metatarsus III. 86. Metatarsus IV. 87. Tarsus I. 88. Tarsus II. 89. Tarsus III. 90. Tarsus IV.



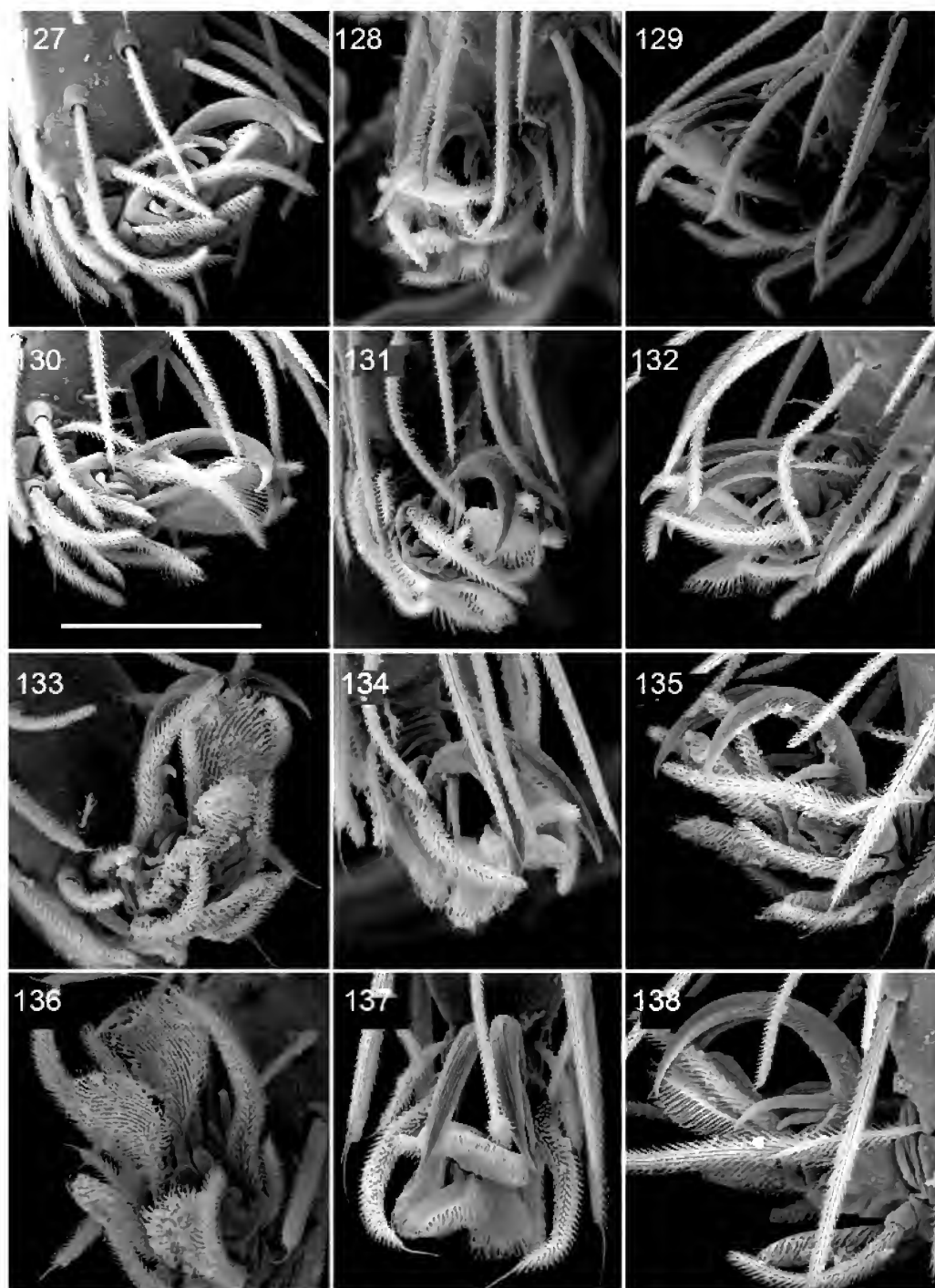
FIGURES 91–102. *Camptoscaphiella paquini*, new species, male (PBI_OON 02187), sensory structures, dorsal view. 91. Tarsal organ, palpal tarsus. 92. Same, tarsus I. 93. Same, tarsus II. 94. Same, tarsus IV. 95. Trichobothrium, palpal tibia. 96. Same, tibia I. 97. Same, tibia II. 98. Same, tibia III. 99. Same, tibia IV. 100. Same, metatarsus I. 101. Same, metatarsus II. 102. Same, metatarsus IV. Scale bar for tarsal organs = 20 μm (vertical), for trichobothria = 10 μm (horizontal).



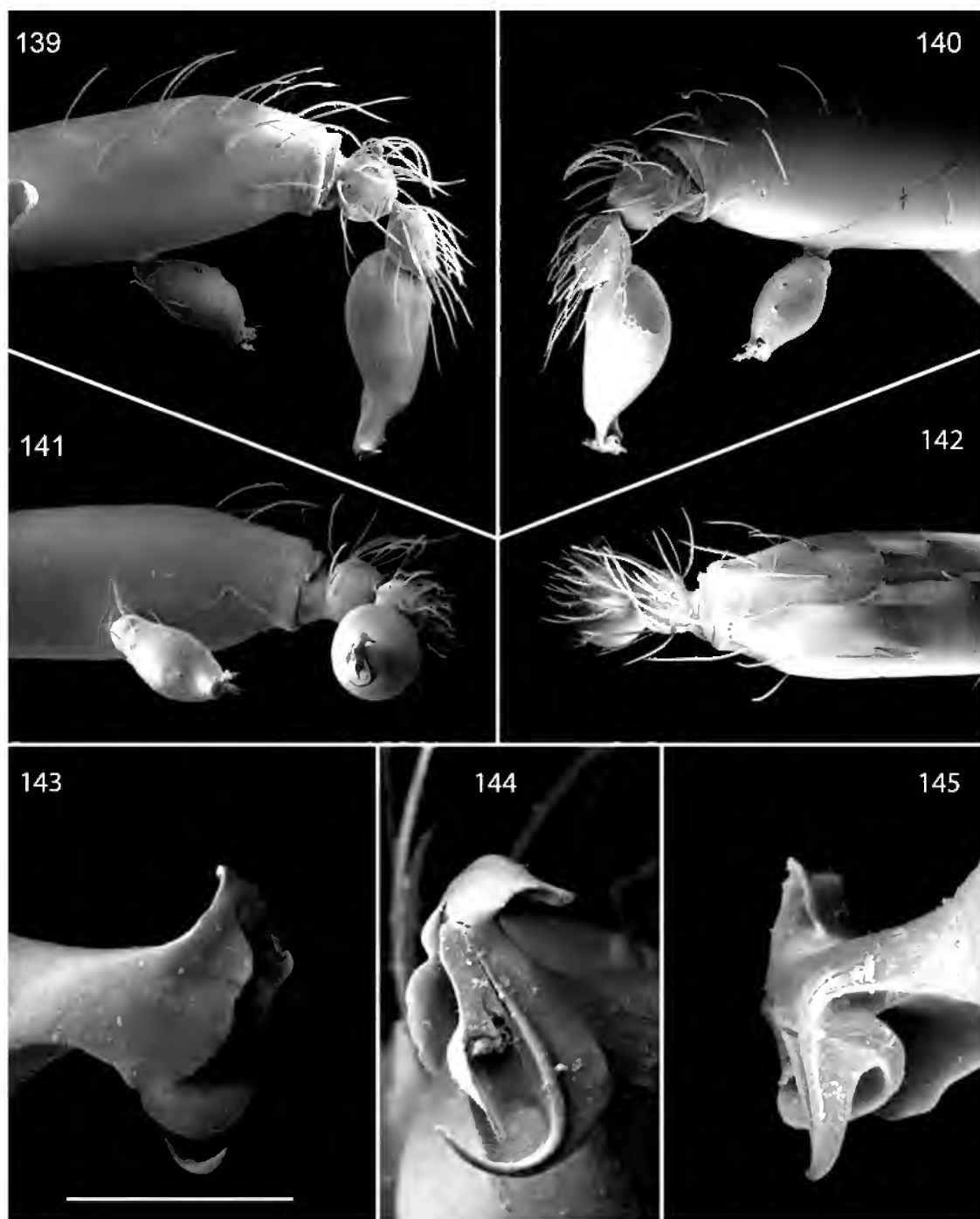
FIGURES 103–115. *Camptoscaphiella paquini*, new species, female (PBI_OON 03056), sensory structures, dorsal view. **103.** Tarsal organ, palpal tarsus. **104.** Same, tarsus I. **105.** Same, tarsus II. **106.** Same, tarsus III. **107.** Same, tarsus IV. **108.** Trichobothria, palpal tibia. **109.** Same, tibia I. **110.** Same, tibia IV. **111.** Same, tibia III. **112.** Same, metatarsus I. **113.** Same, metatarsus II. **114.** Same, metatarsus III. **115.** Same, metatarsus IV. Scale bar for tarsal organs = 20 μm (vertical), for trichobothria = 10 μm (horizontal).



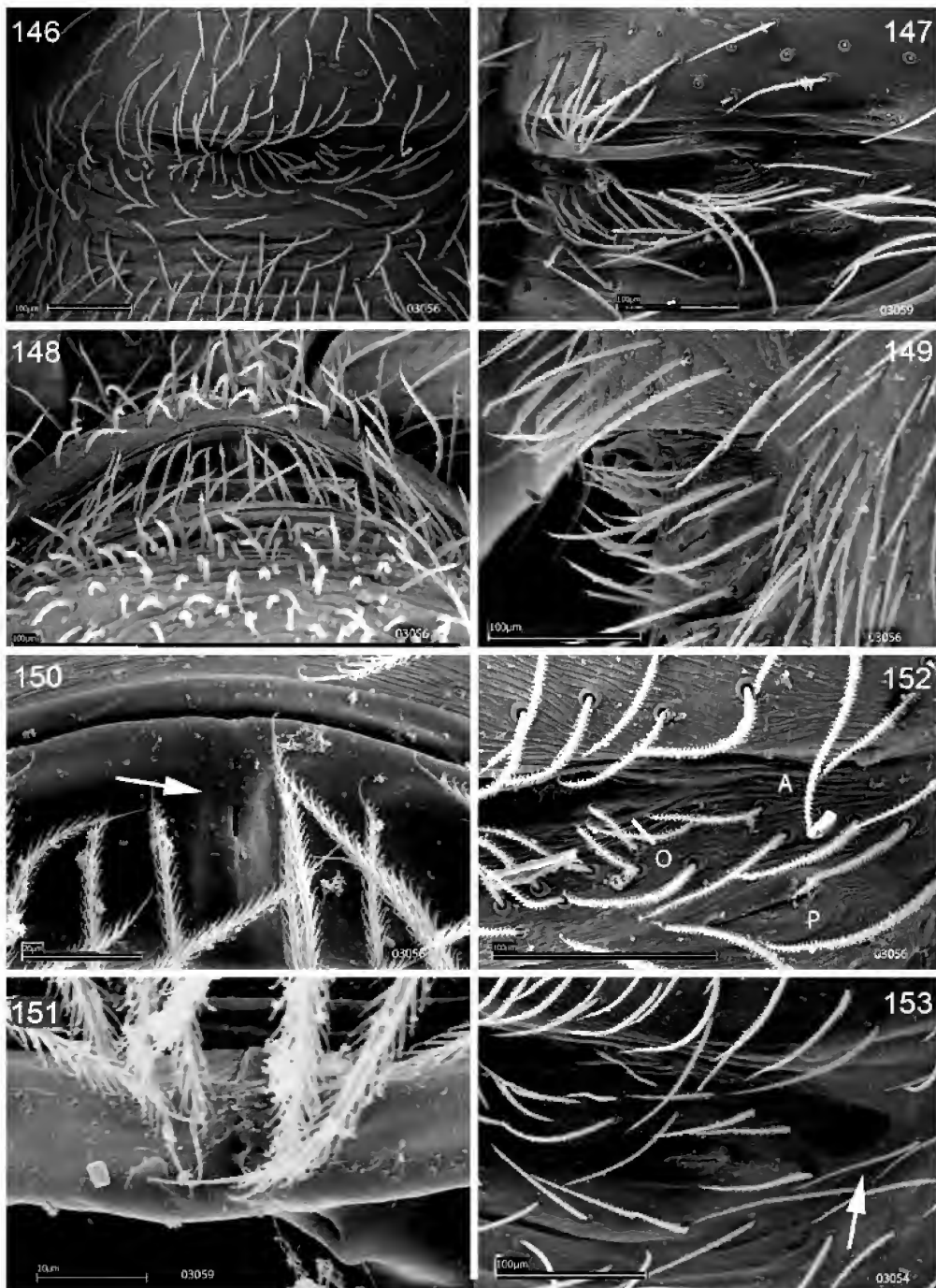
FIGURES 116–126. *Camptoscaphiella paquini*, new species, male (PBI_OON 02187), tarsal claws. 116. Leg I, prolateral view. 117. Same, dorsal view. 118. Same, subventral view. 119. Leg II, prolateral view. 120. Same, dorsal view. 121. Leg III, prolateral view. 122. Same, anterior view. 123. Same, retrolateral view. 124. Leg IV, prolateral view. 125. Same, ventral view. 126. Same, retrolateral view. The images of claws I–III are of right legs and are here reversed to give left perspective. Scale bar = 50 μ m.



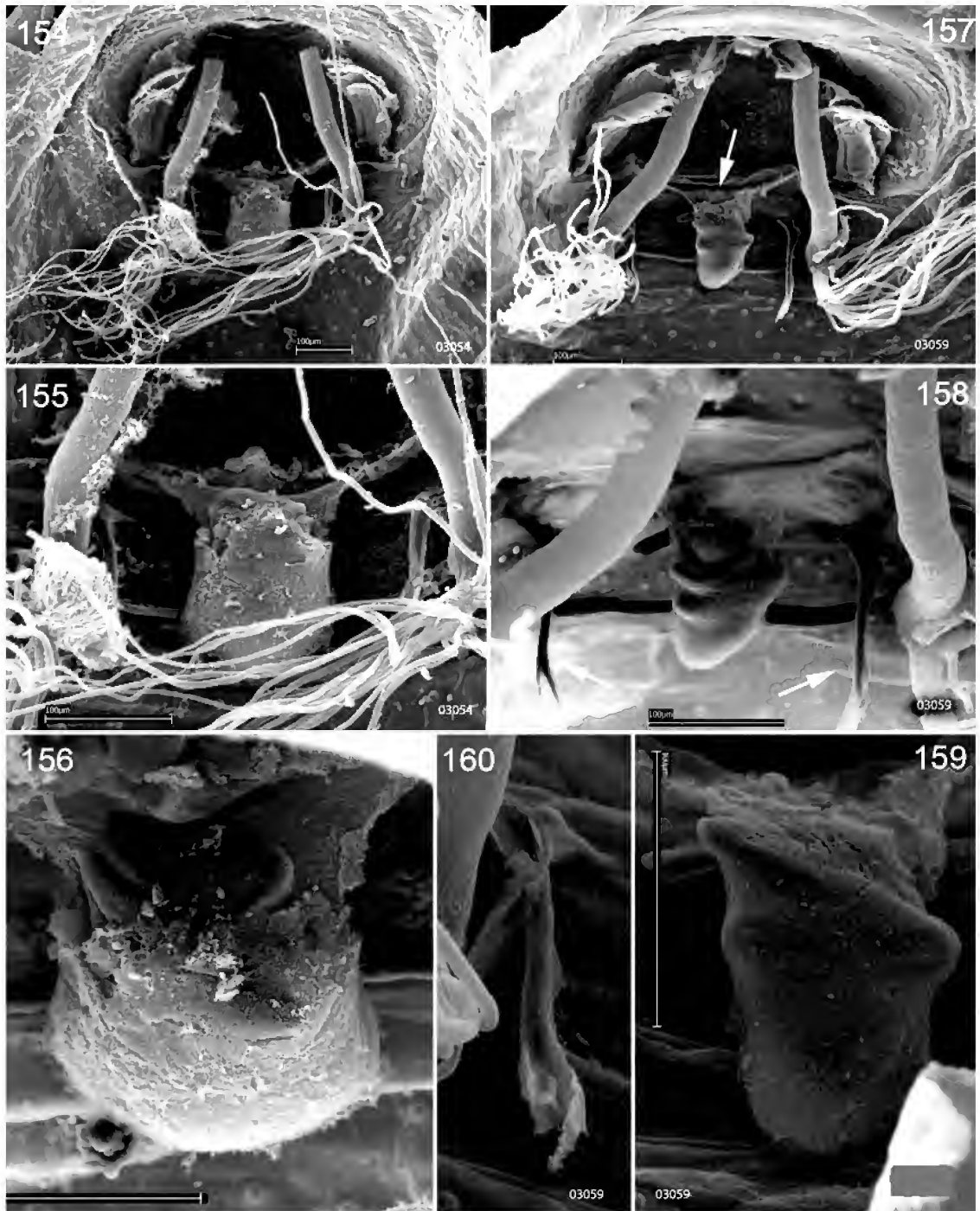
FIGURES 127–138. *Camptoscaphiella paquini*, new species, female (PBI_OON 03056), tarsal claws. 127. Leg I, subventral view. 128. Same, apical view. 129. Same, retrolateral view. 130. Leg II, ventral view. 131. Same, apical view. 132. Same, retrolateral view. 133. Leg III, subventral view. 134. Same, anteriodorsal view. 135. Same, retrolateral view. 136. Leg IV, ventral view. 137. Same, anteriodorsal view. 138. Same, retrolateral view. Scale bar = 50 μ m.



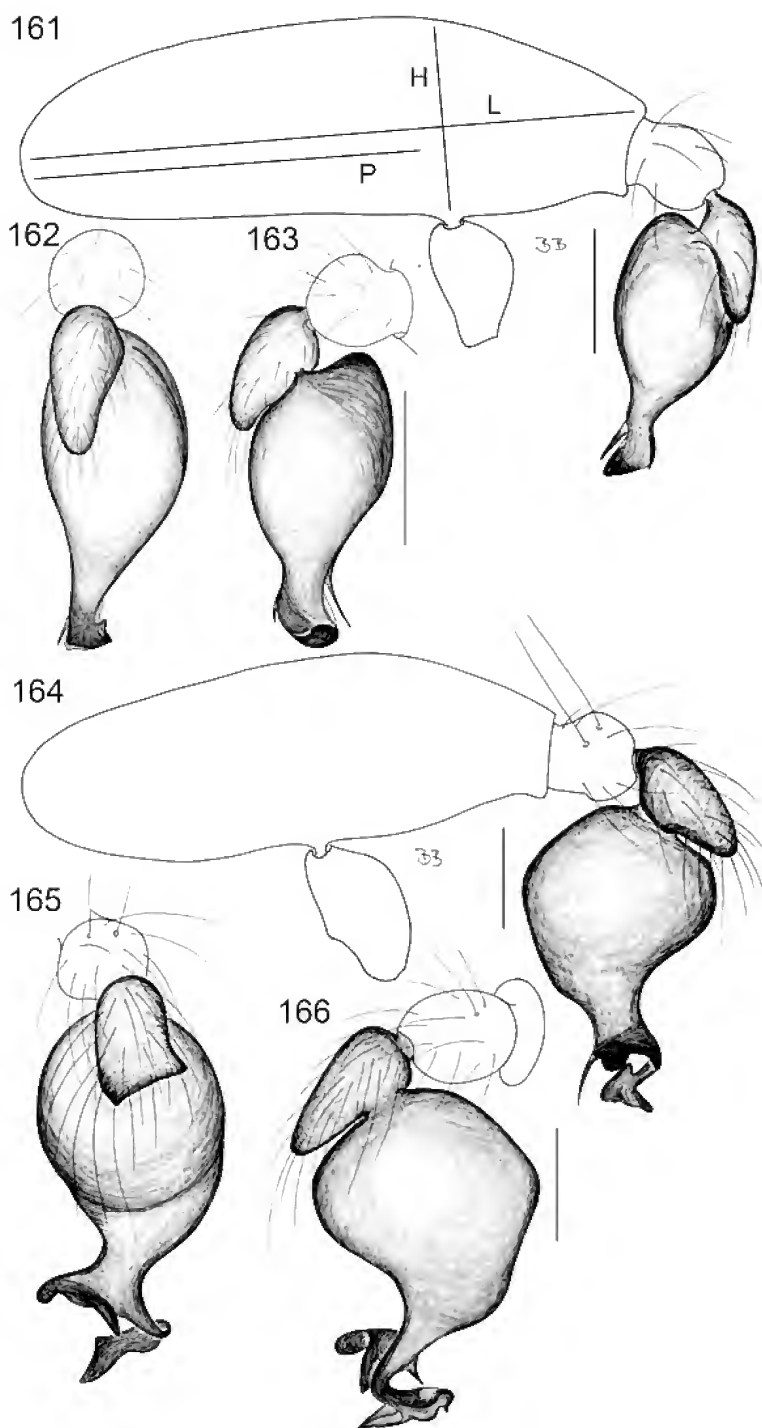
FIGURES 139–145. *Camptoscaphiella paquini*, new species, male (PBI_OON 02187). **139.** Palp, prolateral view. **140.** Same, retrolateral view. **141.** Same, ventral view. **142.** Same, dorsal view. **143.** Embolar region, prolateral view. **144.** Same, apical view. **145.** Same, retrolateral view.



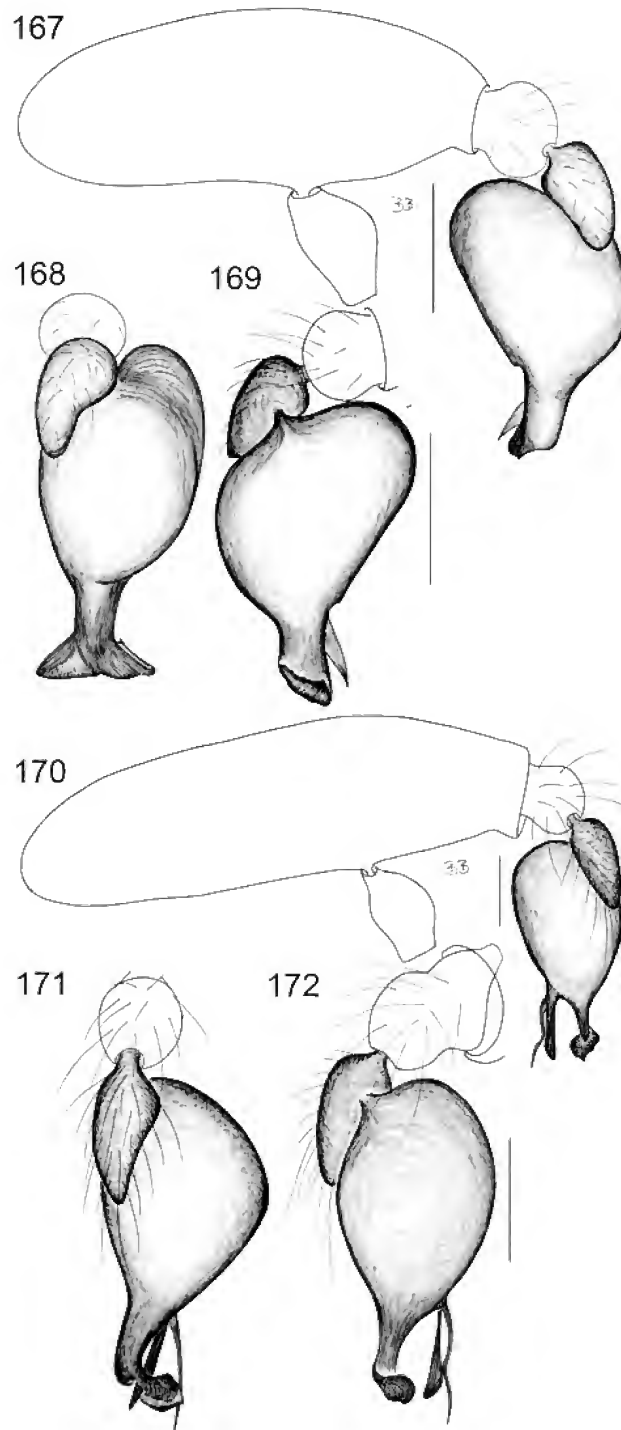
FIGURES 146–153. *Camptoscaphiella paquini*, new species, female (PBI_OON 03056: 146, 148–150, 152; PBI_OON 03059: 147, 151; PBI_OON 03054: 153), epigynal region exterior. **146.** Ventral view. **147.** Sublateral view. **148.** Posterior view. **149.** Lateral view. **150.** Posterior view showing copulatory opening (arrow). **151.** Anterior view showing median row of pores. **152.** Sublateral view showing apodeme orifice (O) and anterior (A) and posterior (P) spiracles. **153.** Sublateral view showing edge of postepigastric scutum (arrow).



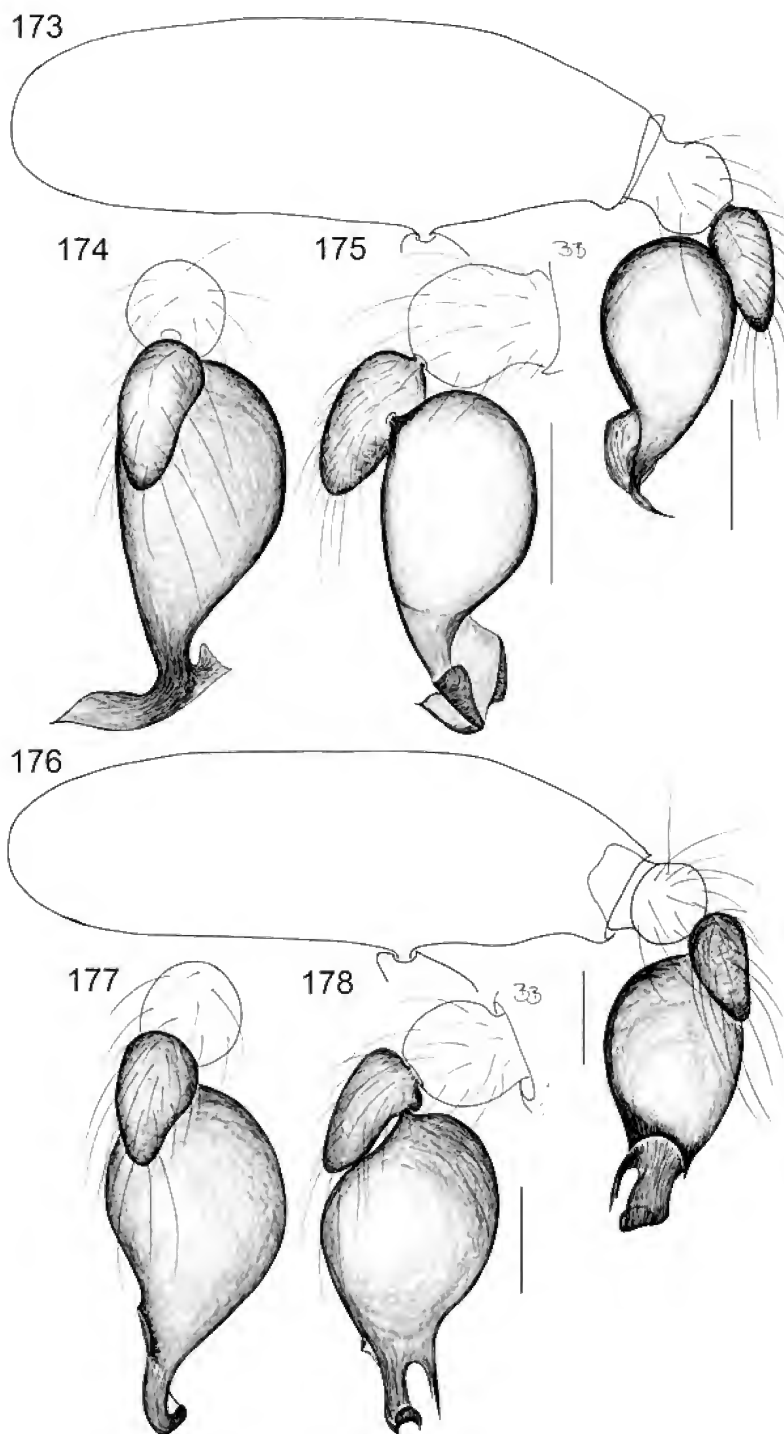
FIGURES 154–160. *Camptoscapbiella paquini*, new species, female (PBI_OON 03054: 154–156; PBI_OON 03059: 157–160), epigynal area interior. **154.** Dorsal view of entire region. **155.** Same, showing receptaculum and apodemes. **156.** Receptaculum, anterior view, showing coiled duct enclosed by membrane. **157.** Dorsal view of entire region, showing apparent opening of gonopore (arrow). **158.** Same, receptaculum and apodemes (arrows). **159.** Receptaculum, dorsal view. **160.** Left apodeme, dorsal view.



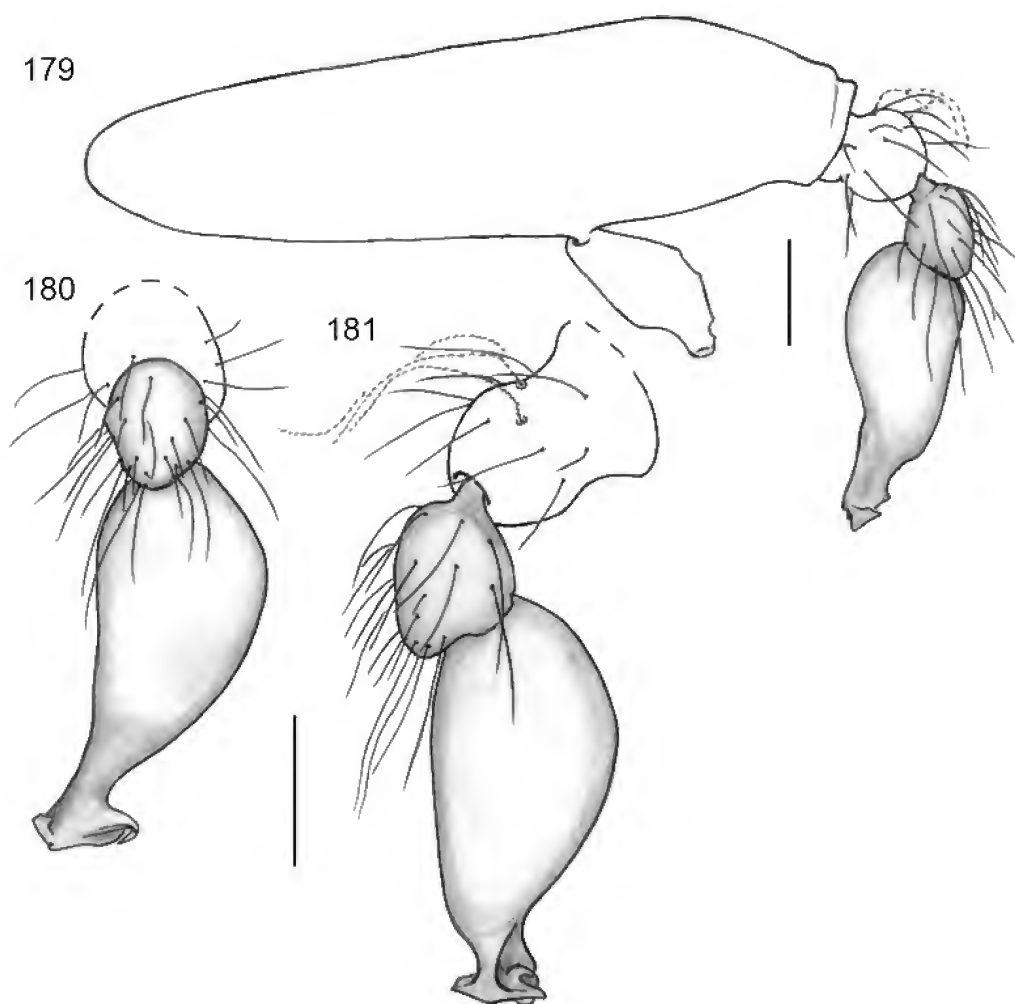
FIGURES 161–166. *Camptoscaphiella fulva* Caporiacco (PBI_OON 15528) and *C. hiliaris* Brignoli (PBI_OON 23376), male left palpi. **161.** *C. fulva*, prolateral view. **162.** Same, dorsal view. **163.** Same, retrolateral view. **164.** *C. hiliaris*, prolateral view. **165.** Same, dorsal view. **166.** Same, retrolateral view. H = height of patella, L = length, P = posterior extension. Scale bars = 0.1 mm.



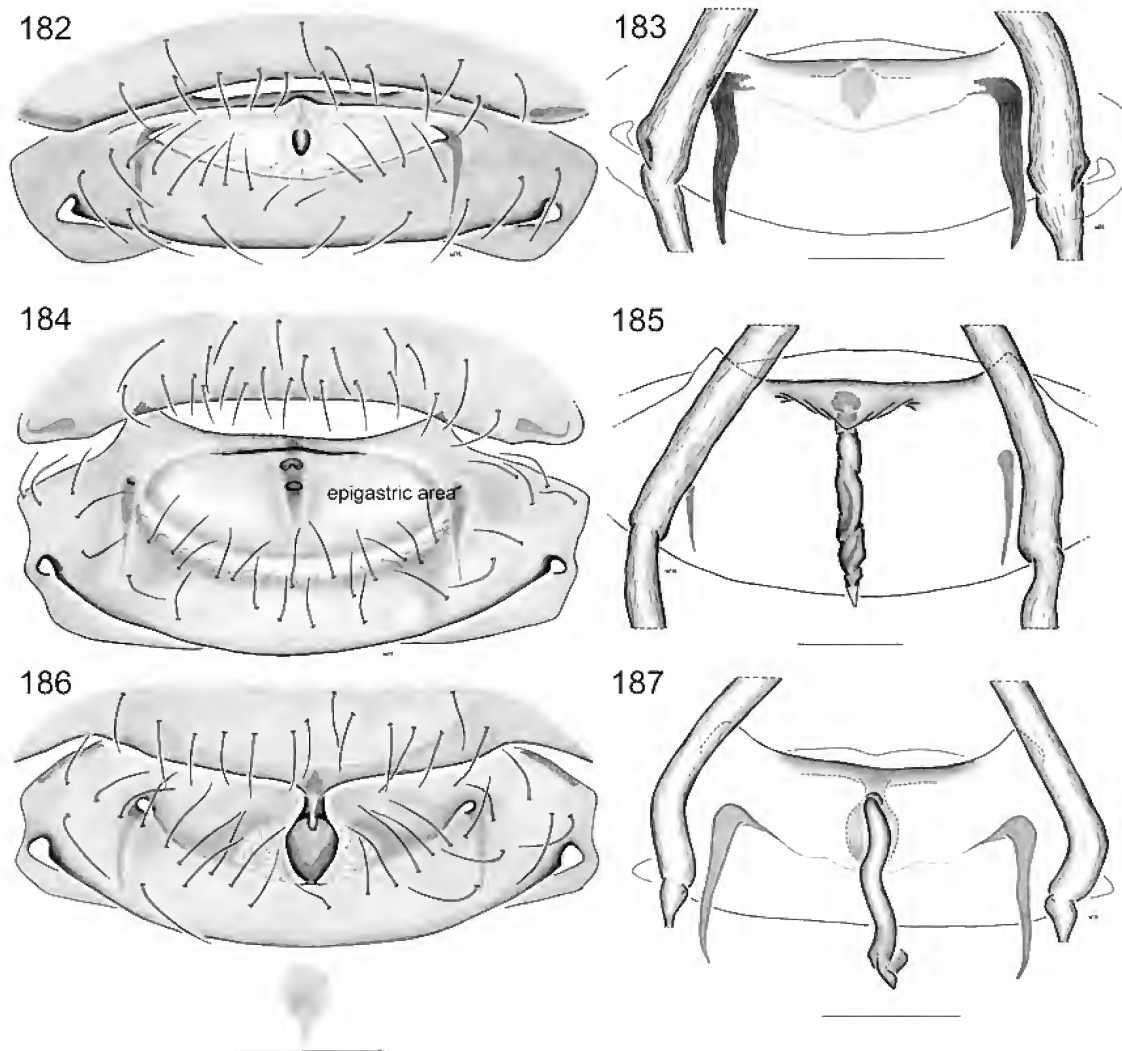
FIGURES 167–172. *Camptoscaphiella simoni*, new species (PBI_OON 23343) and *C. loebli*, new species (PBI_OON 15618), male left palpi. **167.** *C. simoni*, prolateral view. **168.** Same, dorsal view. **169.** Same, retrolateral view. **170.** *C. loebli*, prolateral view. **171.** Same, dorsal view. **172.** Same, retrolateral view. Scale bars = 0.1 mm.



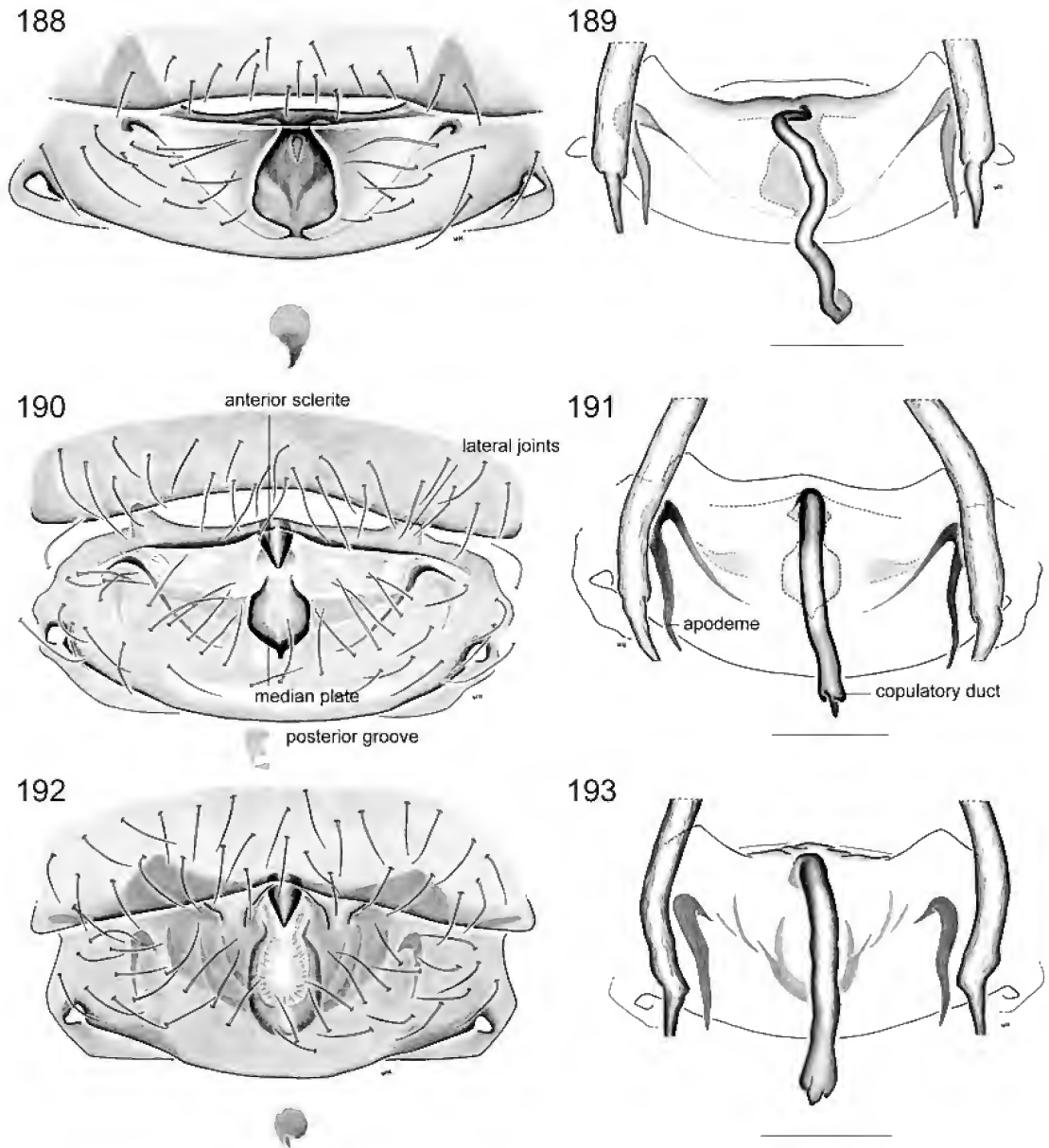
FIGURES 173–178. *Camptoscaphiella schwendingeri*, new species (PBI_OON 23365) and *C. nepalensis*, new species (PBI_OON 15375), male left palpi. 173. *C. schwendingeri*, prolateral view. 174. Same, dorsal view. 175. Same, retrolateral view. 176. *C. nepalensis*, prolateral view. 177. Same, dorsal view. 178. Same, retrolateral view. Scale bars = 0.1 mm.



FIGURES 179–181. *Camptoscapbiella paquini*, new species (PBI_OON 02187), male left palp. **179.** Prolateral view. **180.** Dorsal view. **181.** Retrolateral view. Scale bars = 0.1 mm.

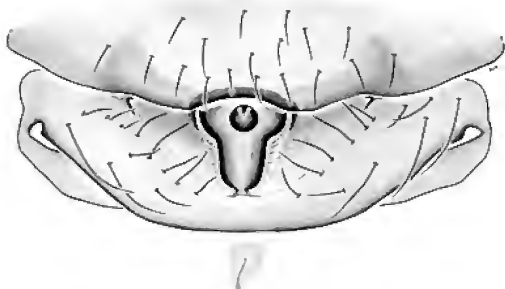


FIGURES 182–187. *Camptoscaphiella* species, female epigyna. **182.** *C. fulva* Caporiacco (PBI_OON 12527), ventral view. **183.** Same, dorsal view. **184.** *C. gunsa*, new species (PBI_OON 15715), ventral view. **185.** Same, dorsal view. **186.** *C. loebli*, new species (PBI_OON 15718), ventral view. **187.** Same, dorsal view. Scale bars = 0.1 mm.

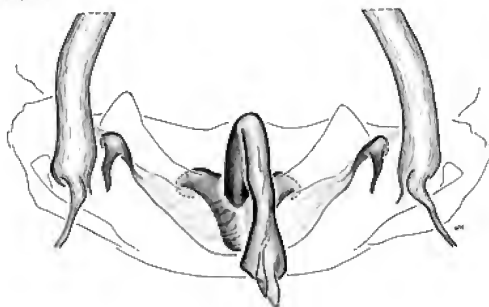


FIGURES 188–193. *Camptoscaphiella* species, female epigyna. **188.** *C. taplejung*, new species (PBI_OON 15760), ventral view. **189.** Same, dorsal view. **190.** *C. martensi*, new species (PBI_OON 15407), ventral view. **191.** Same, dorsal view. **192.** *C. martensi*, new species (PBI_OON 15724), ventral view. **193.** Same, dorsal view. Scale bars = 0.1 mm.

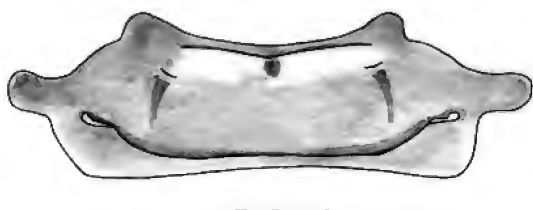
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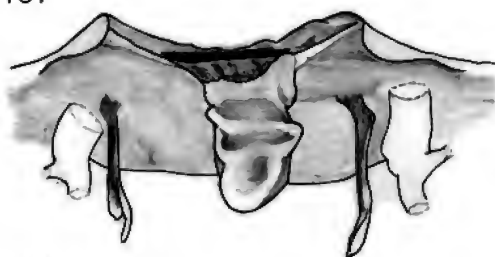
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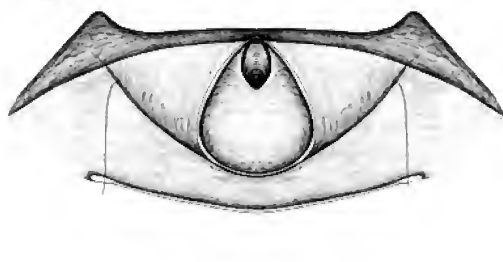
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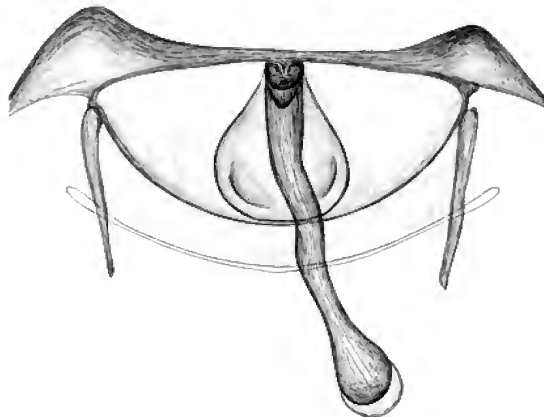
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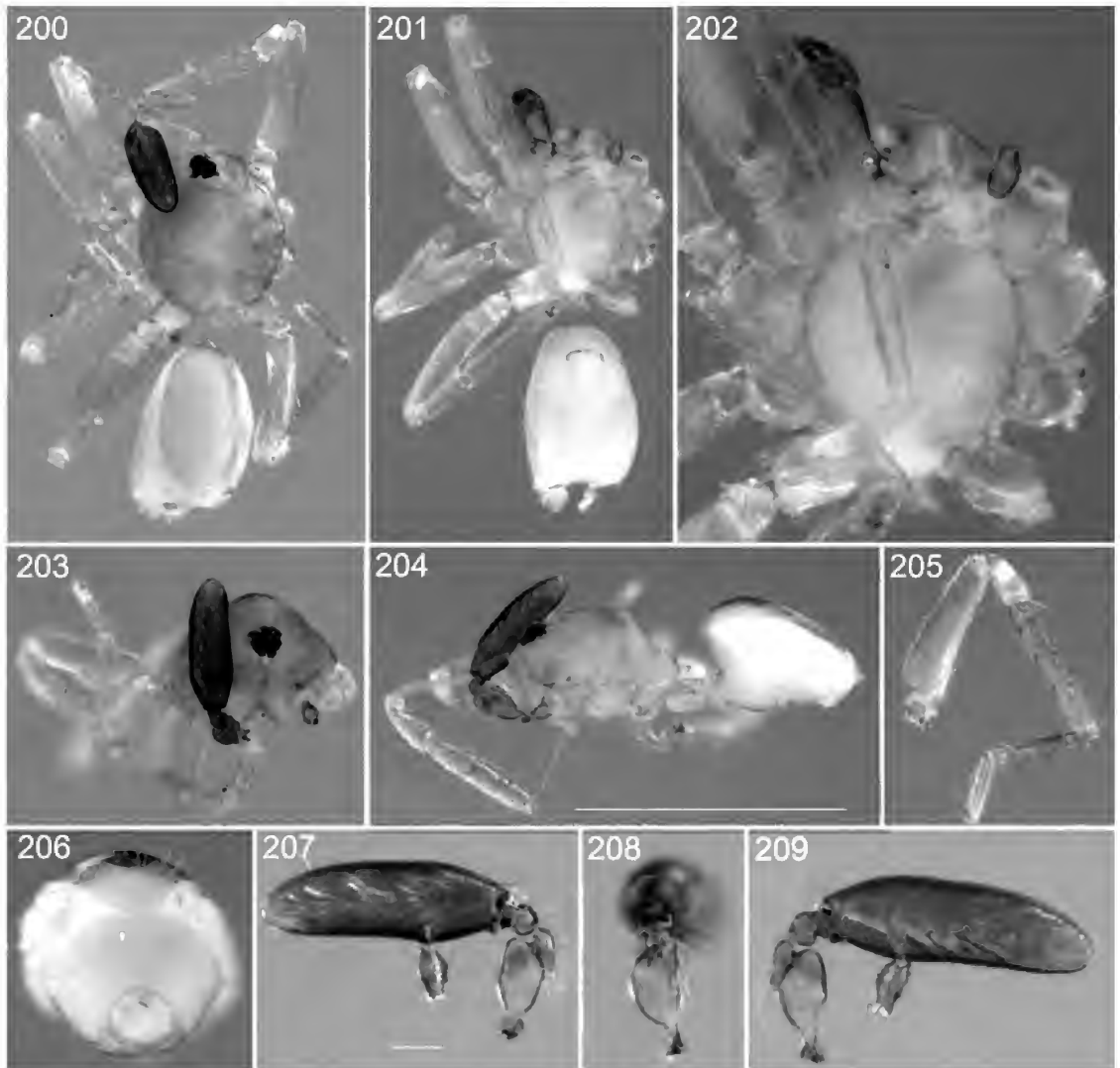
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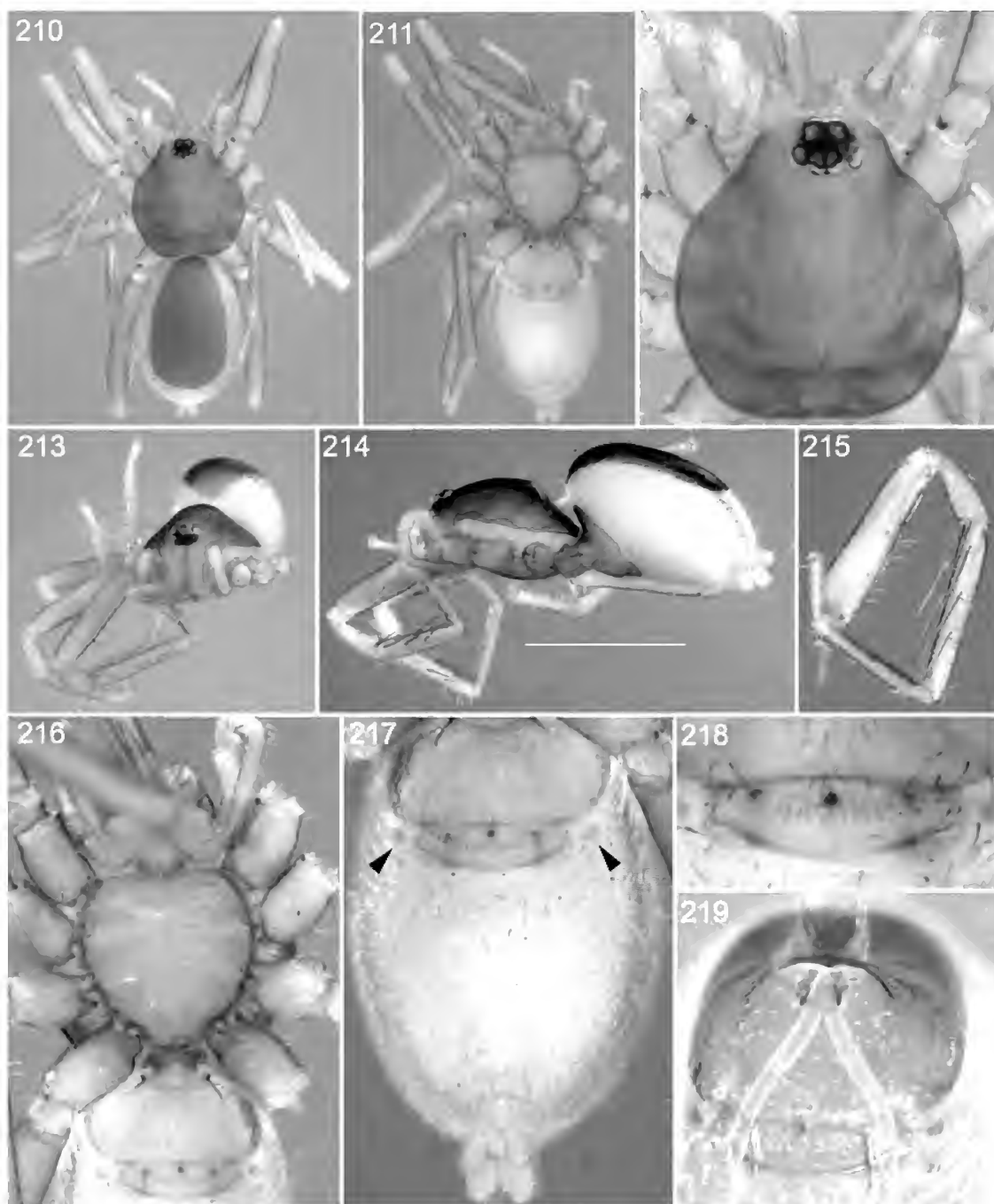
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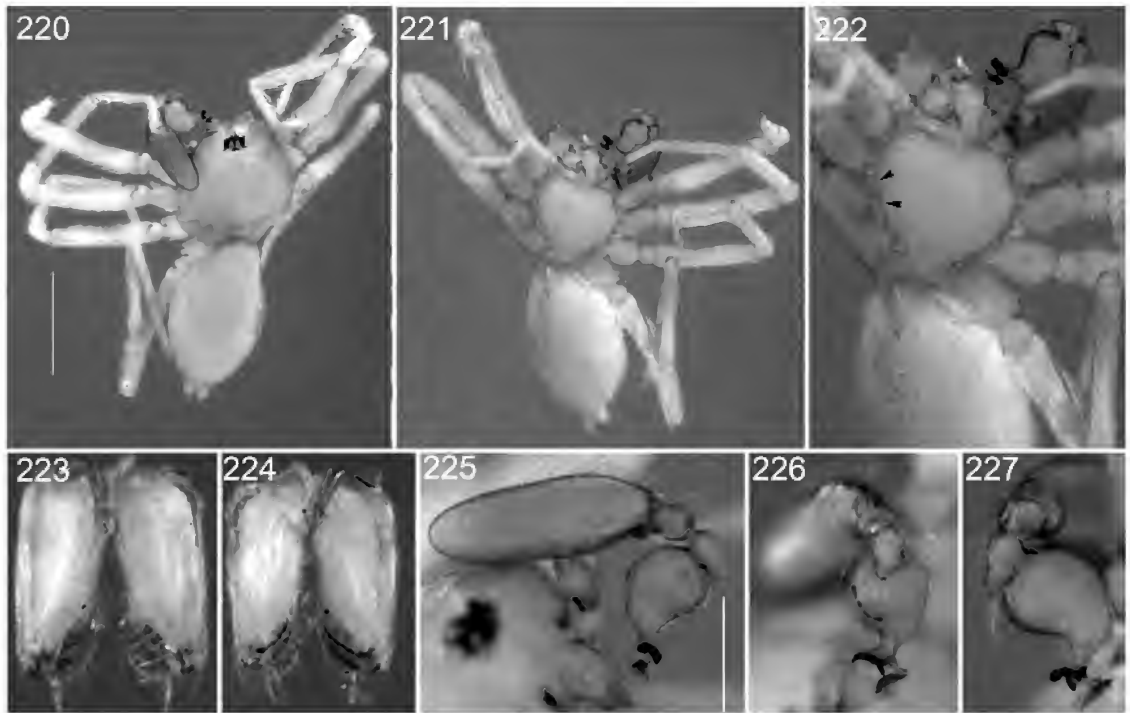
FIGURES 194–199. *Camptoscaphiella* species, female epigyna. **194.** *C. panchthar*, new species (PBI_OON 15771), ventral view. **195.** Same, dorsal view. **196.** *C. paquini*, new species (PBI_OON 03059), ventral view. **197.** Same, dorsal view. **198.** *C. nepalensis*, new species (PBI_OON 23385), ventral view. **199.** Same, dorsal view. Scale bars = 0.1 mm.



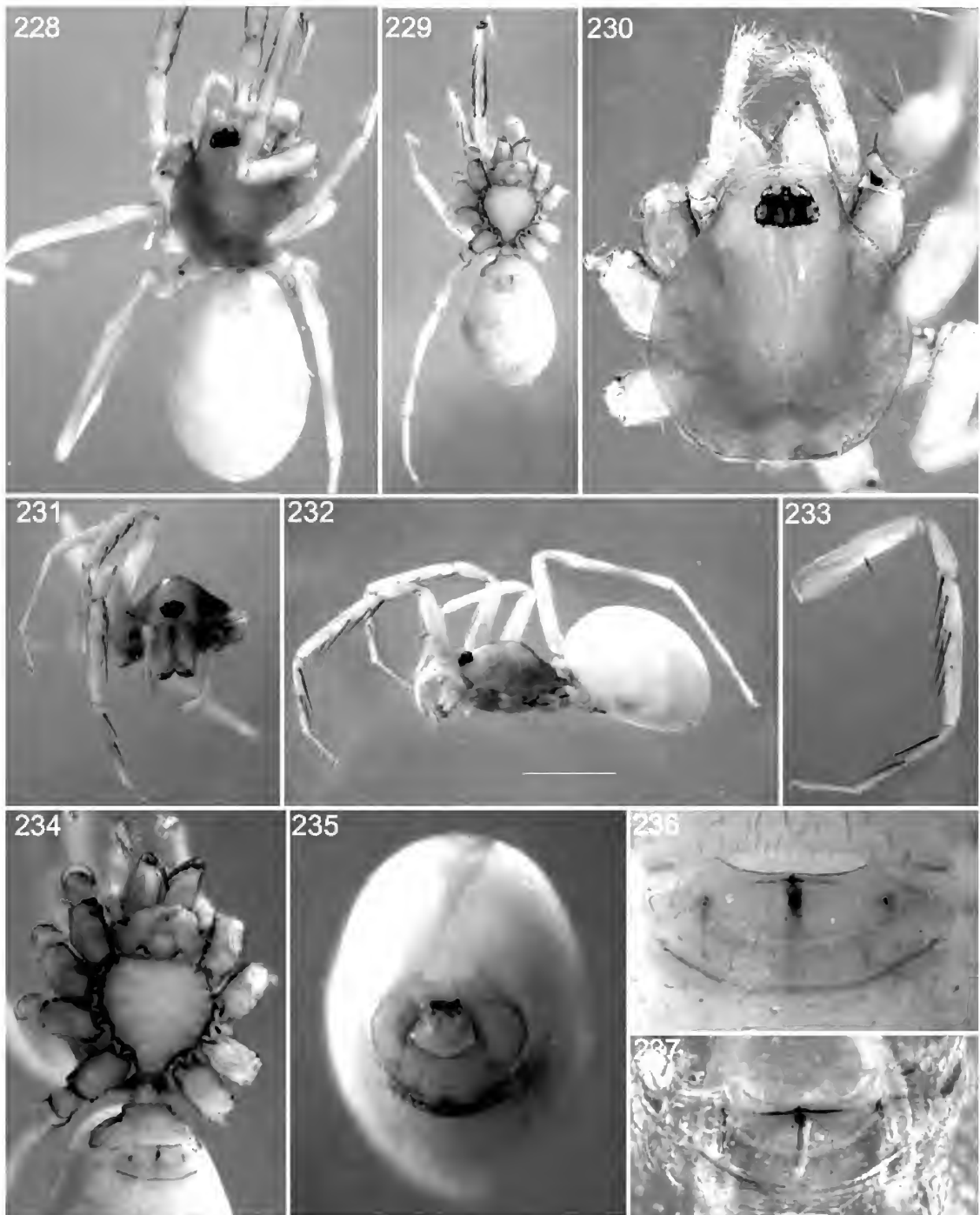
FIGURES 200–209. *Camptoscaphiella fulva* Caporiacco, male (PBI_OON 15528). **200.** Habitus, dorsal view. **201.** Same, ventral view. **202.** Sternum, ventral view. **203.** Carapace, anterior view. **204.** Habitus, lateral view. **205.** Leg I, prolateral view. **206.** Abdomen, anterior view. **207.** Palp, prolateral view. **208.** Same, dorsal view. **209.** Same, retrolateral view. Scale bars, habitus = 1.0 mm, palp = 0.1 mm.



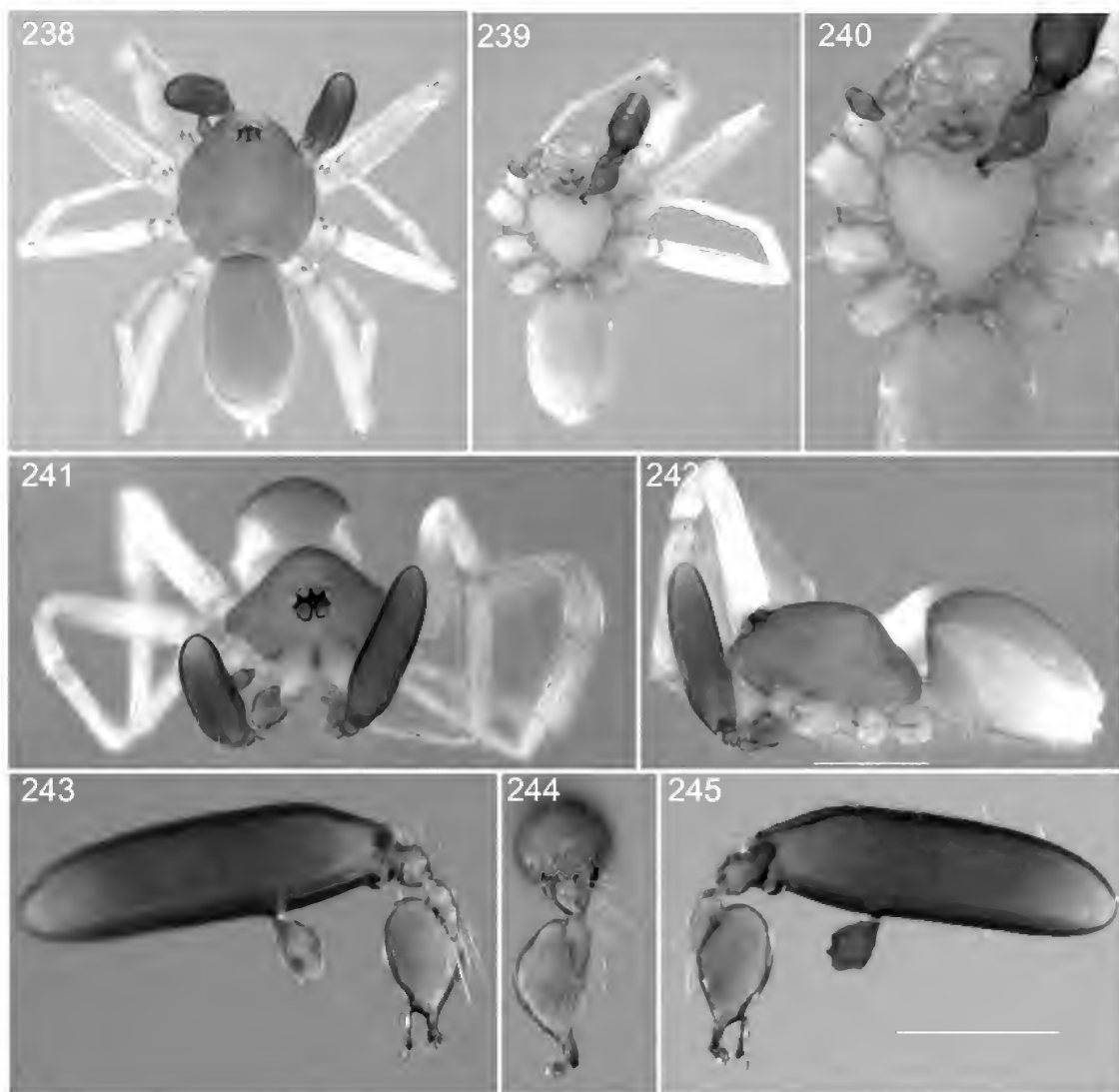
FIGURES 210–219. *Camptoscaphiella fulva* Caporiacco, female (PBI_OON 12527). **210.** Habitus, dorsal view. **211.** Same, ventral view. **212.** Carapace, dorsal view. **213.** Habitus, anterior view. **214.** Same, lateral view. **215.** Leg I, prolateral view. **216.** Sternum, ventral view. **217.** Abdomen, ventral view. **218.** Epigynum, ventral view. **219.** Same, dorsal view. Arrows show the lateral sclerites. Scale bars, habitus = 1.0 mm, epigynum = 0.1 mm.



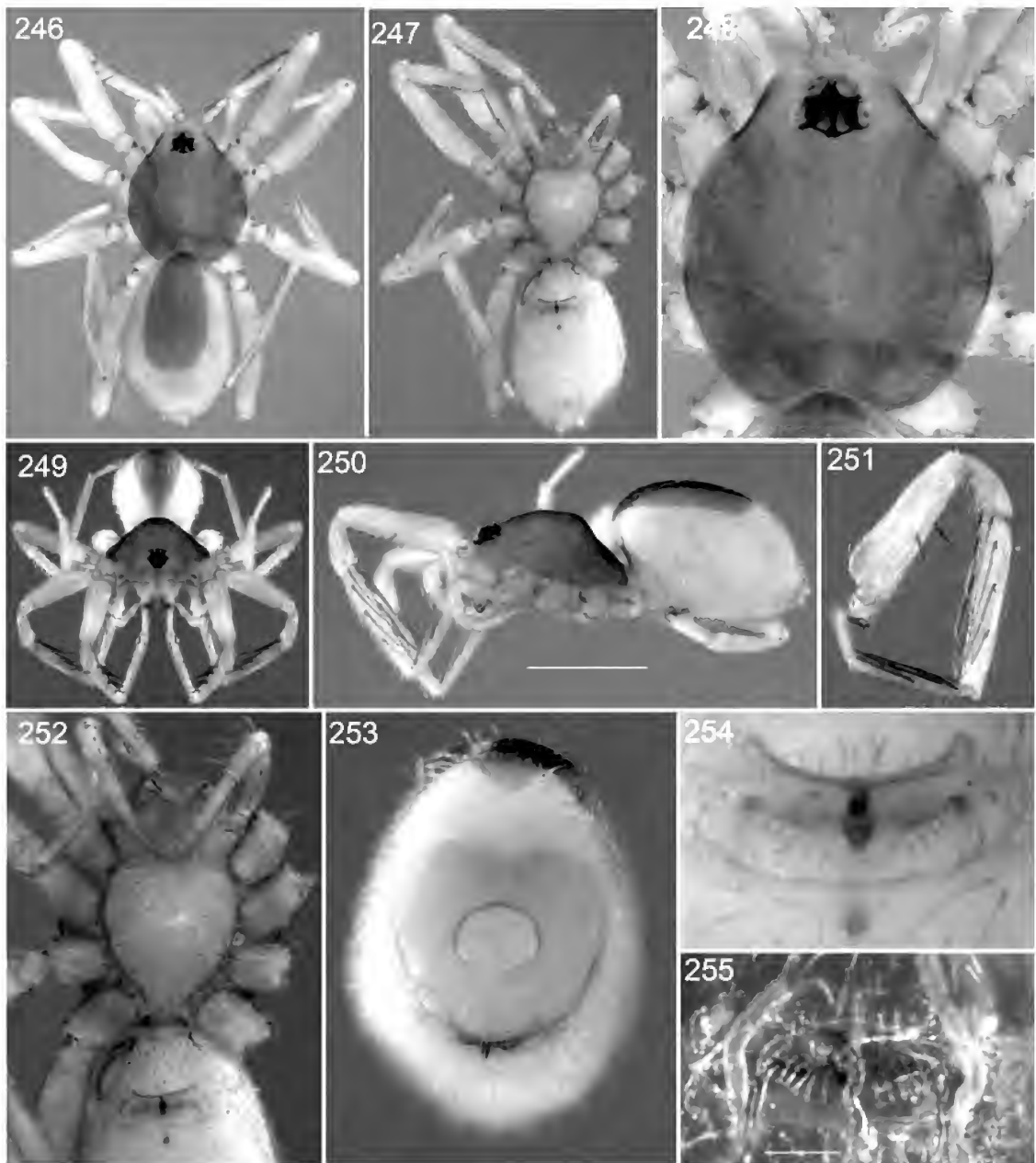
FIGURES 220–227. *Camptoscaphiella hilaris* Brignoli, male (PBI_OON 23376). **220.** Habitus, dorsal view. **221.** Same, ventral view. **222.** Sternum, ventral view. **223.** Chelicerae, ventral view. **224.** Chelicerae, dorsal view. **225.** Palp, prolateral view. **226.** Palp, dorsal view. **227.** Palp, retrolateral view. Arrows show narrow extensions between coxae and extensions of precoxal triangles. Scale bars, habitus = 1.0 mm, epigynum = 0.1 mm.



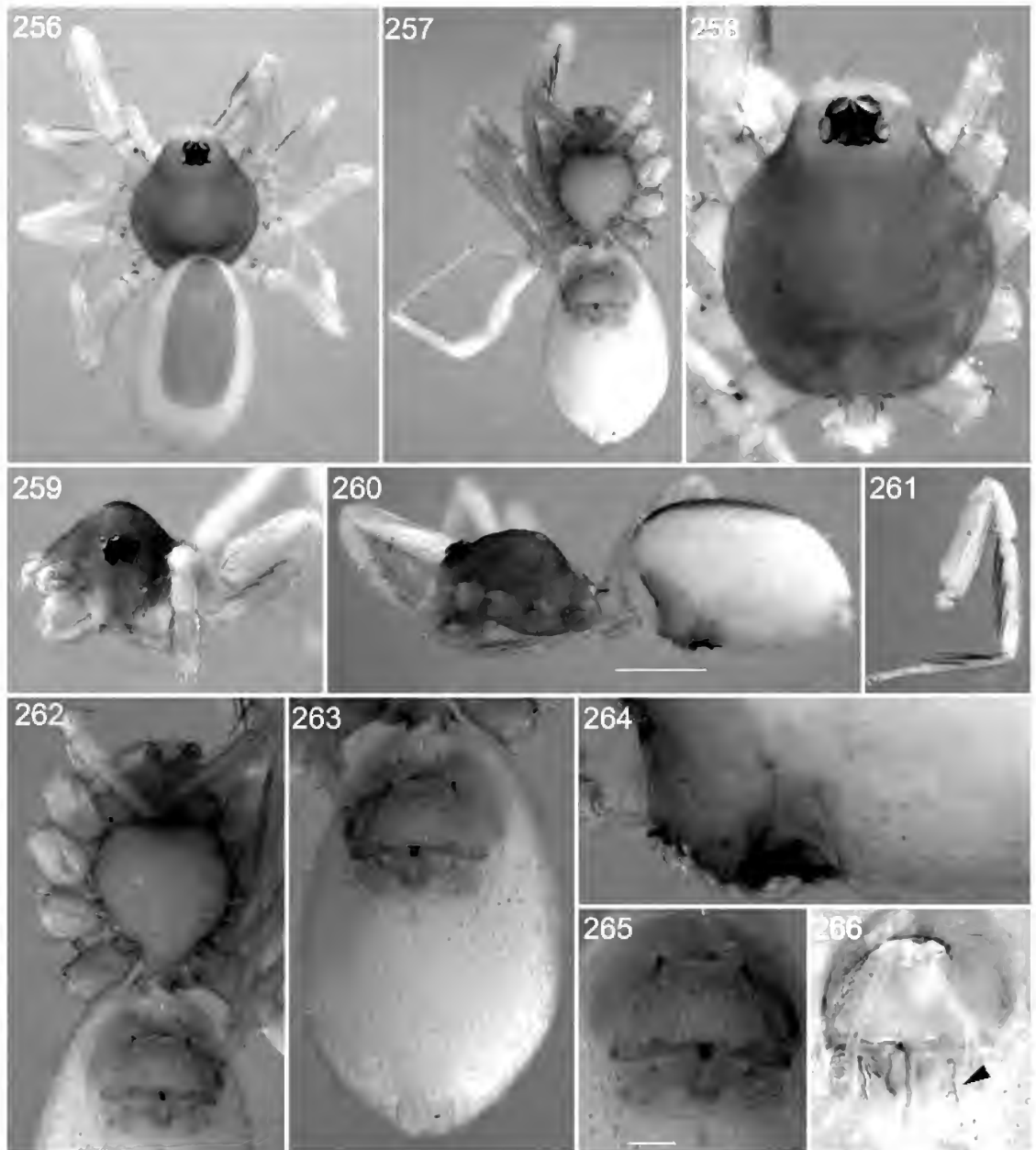
FIGURES 228–237. *Camptoscapphiella gunsa* Brignoli, female (PBI_OON 15715). 228. Habitus, dorsal view. 229. Same, ventral view. 230. Carapace, dorsal view. 231. Same, anterior view. 232. Habitus, lateral view. 233. Leg I, prolateral view. 234. Sternum, ventral view. 235. Abdomen, anterior view. 236. Epigynum, ventral view. 237. Same, dorsal view. Scale bars, habitus = 1.0 mm, epigynum = 0.1 mm.



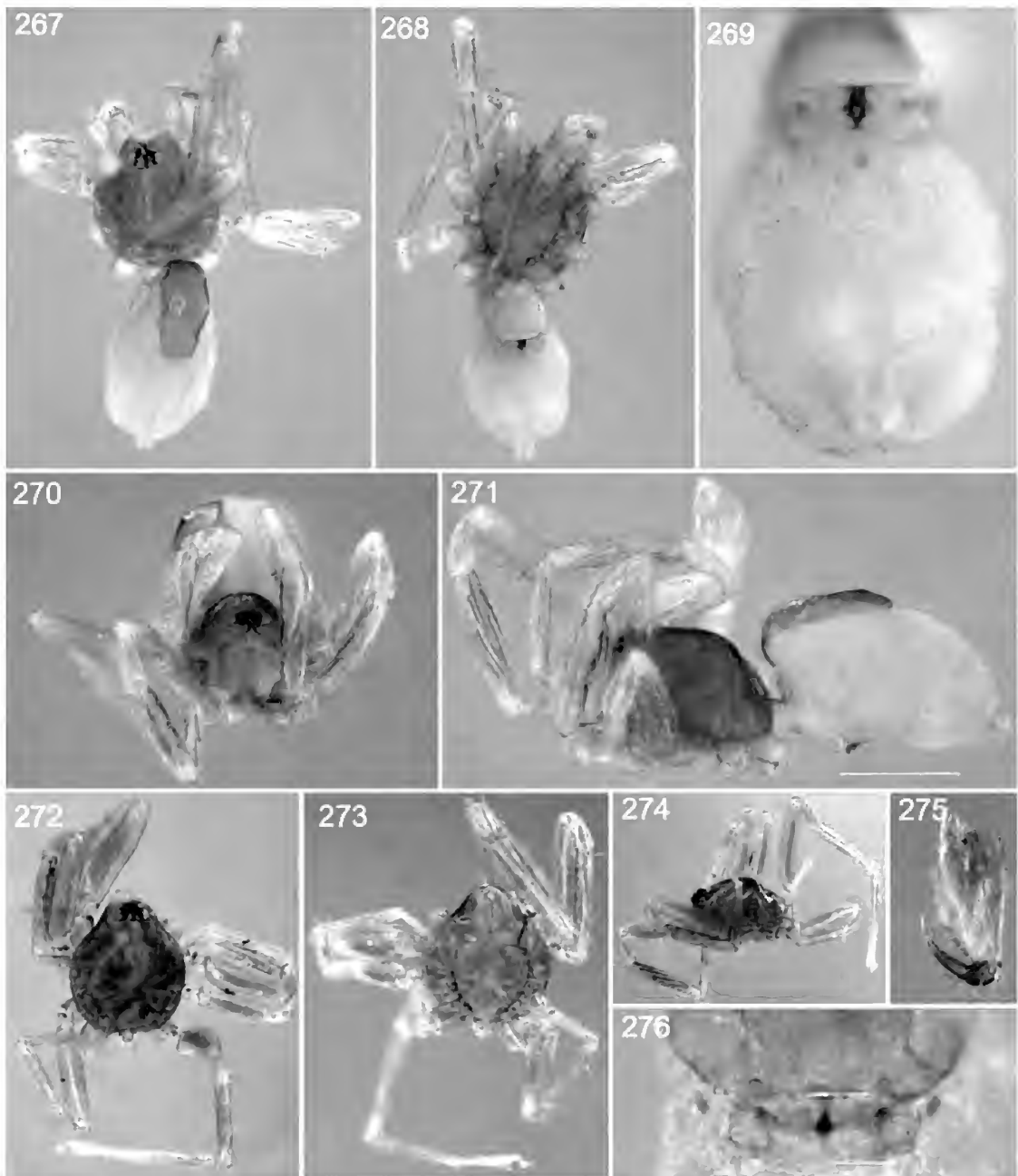
FIGURES 238–245. *Camptoscaphiella loebli*, new species, male (PBI_OON 15618). **238.** Habitus, dorsal view. **239.** Same, ventral view. **240.** Sternum, ventral view. **241.** Habitus, anterior view. **242.** Same, lateral view. **243.** Palp, prolateral view. **244.** Palp, dorsal view. **245.** Palp, retrolateral view. Scale bars, habitus = 0.5 mm, palp = 0.3 mm.



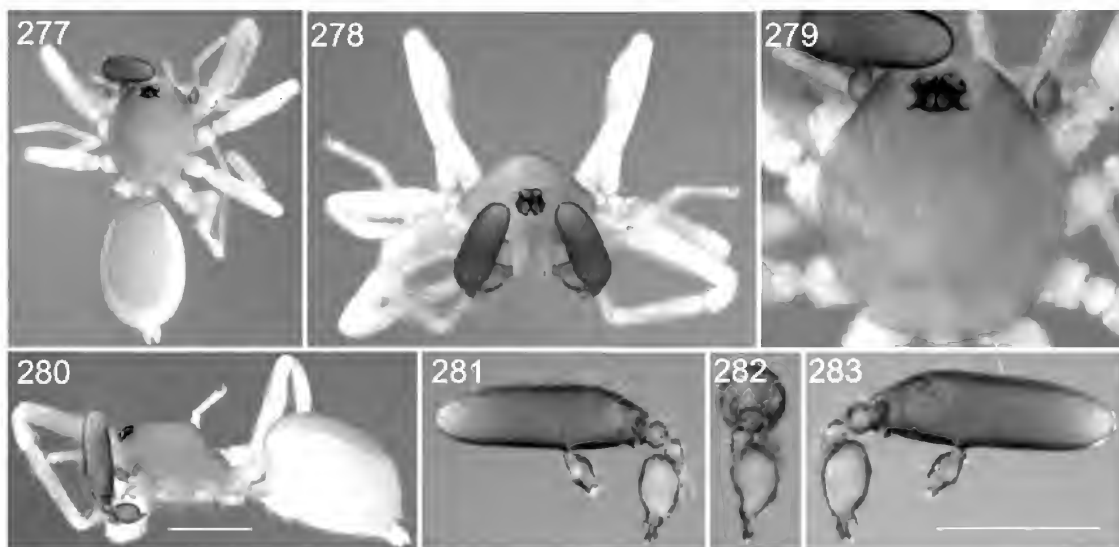
FIGURES 246–255. *Camptoscaphiella loebli*, new species, female (PBI_OON 15407). 246. Habitus, dorsal view. 247. Same, ventral view. 248. Carapace, dorsal view. 249. Habitus, anterior view. 250. Same, lateral view. 251. Leg I, prolateral view. 252. Sternum, ventral view. 253. Abdomen, anterior view. 254. Epigynum, ventral view. 255. Same, dorsal view. Scale bars, habitus = 0.7 mm, epigynum = 0.1 mm.



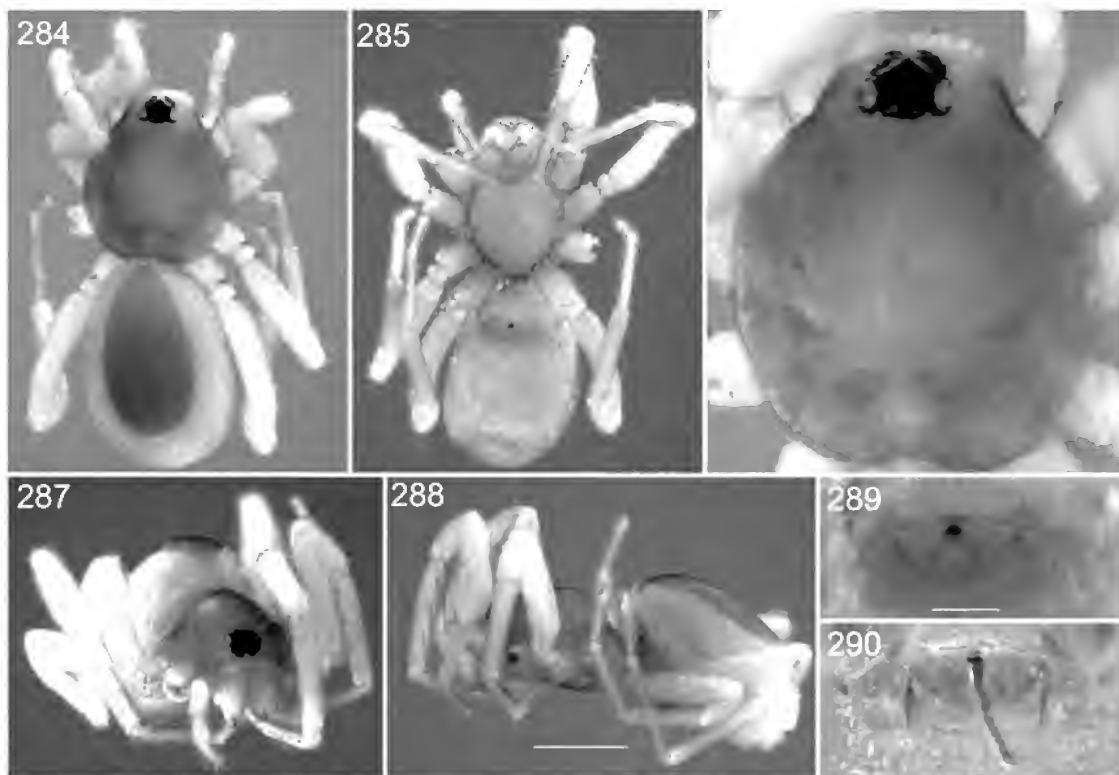
FIGURES 256–266. *Camptoscaphiella martensi*, new species, female (PBI_OON 15724). 256. Habitus, dorsal view. 257. Same, ventral view. 258. Carapace, dorsal view. 259. Same, anterior view. 260. Habitus, lateral view. 261. Leg I, prolateral view. 262. Sternum, ventral view. 263. Abdomen, ventral view. 264. Abdomen, lateral view. 265. Epigynum, ventral view. 266. Same, dorsal view. Arrow shows posteriorly directed apodemes. Scale bars, habitus = 0.4 mm, epigynum = 0.1 mm.



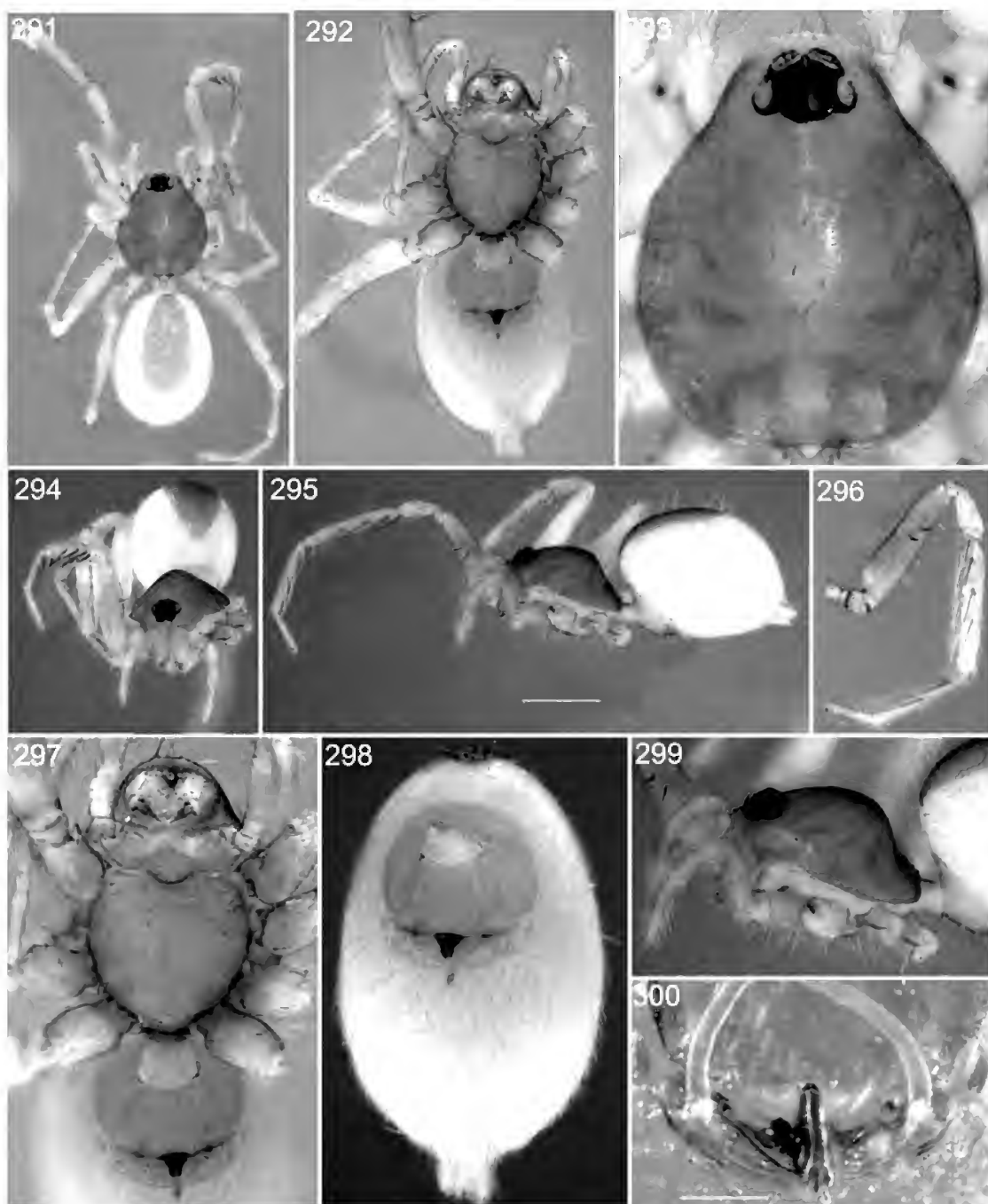
FIGURES 267–276. *Camptoscapphiella strepens* Brignoli (267–271, PBI_OON 23388) and *C. silens* Brignoli (272–276, PBI_OON 23389), females. 267. Habitus, dorsal view. 268. Same, ventral view. 269. Abdomen, ventral view. 270. Habitus, anterior view. 271. Same, lateral view. 272. Cephalothorax, dorsal view. 273. Same, ventral view. 274. Same, posterior view. 275. Chelicera, anterior view. 276. Epigynum, ventral view. Scale bars, habitus = 0.6 mm, epigynum = 0.1 mm.



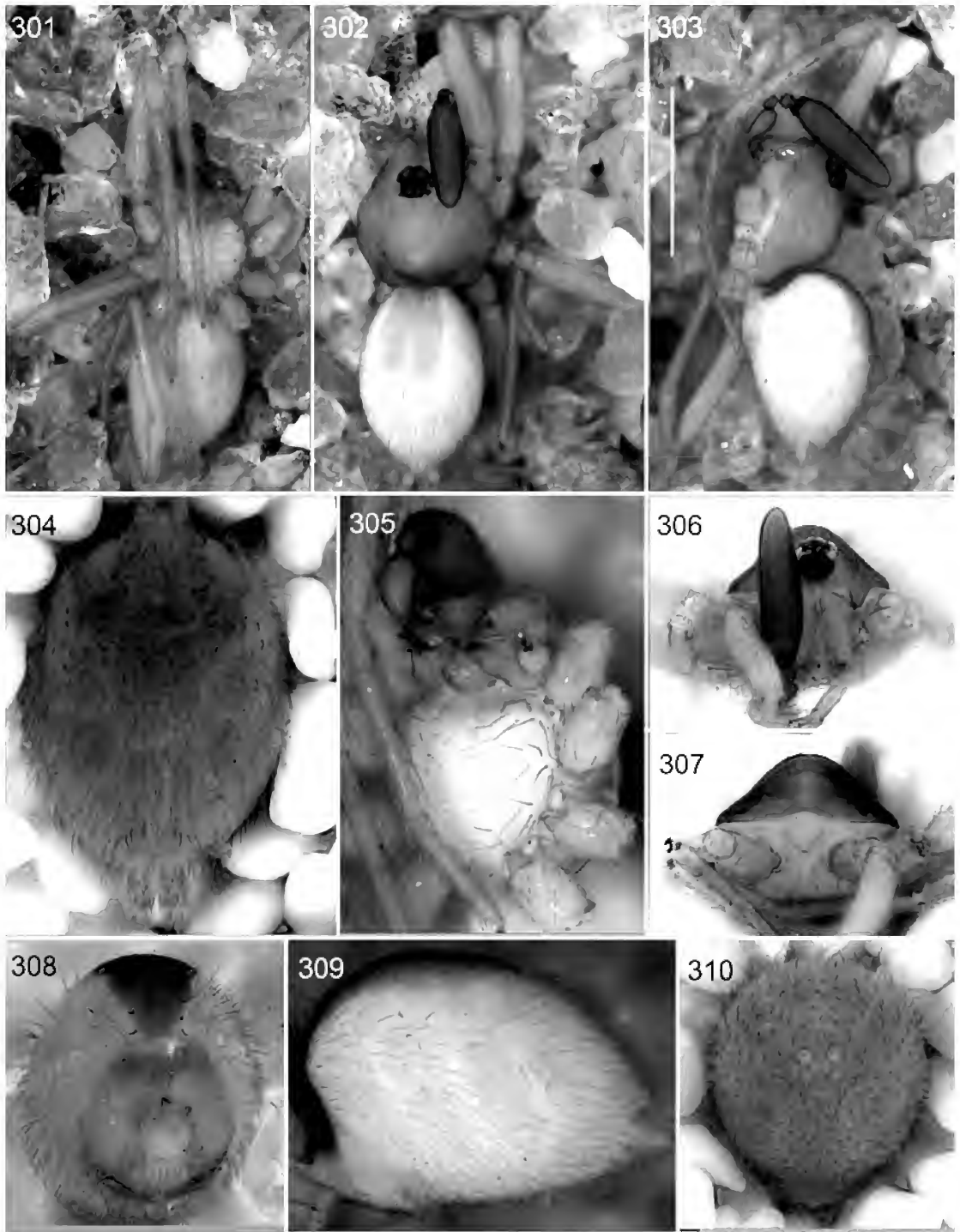
FIGURES 277–283. *Camptoscaphiella nepalensis*, new species, male (PBI_OON 15375). 277. Habitus, dorsal view. 278. Carapace, frontal view. 279. Same, dorsal view. 280. Habitus, lateral view. 281. Palp, prolateral view. 282. Palp, dorsal view. 283. Palp, retrolateral view. Scale bars, habitus = 0.5 mm, palp = 0.35 mm.



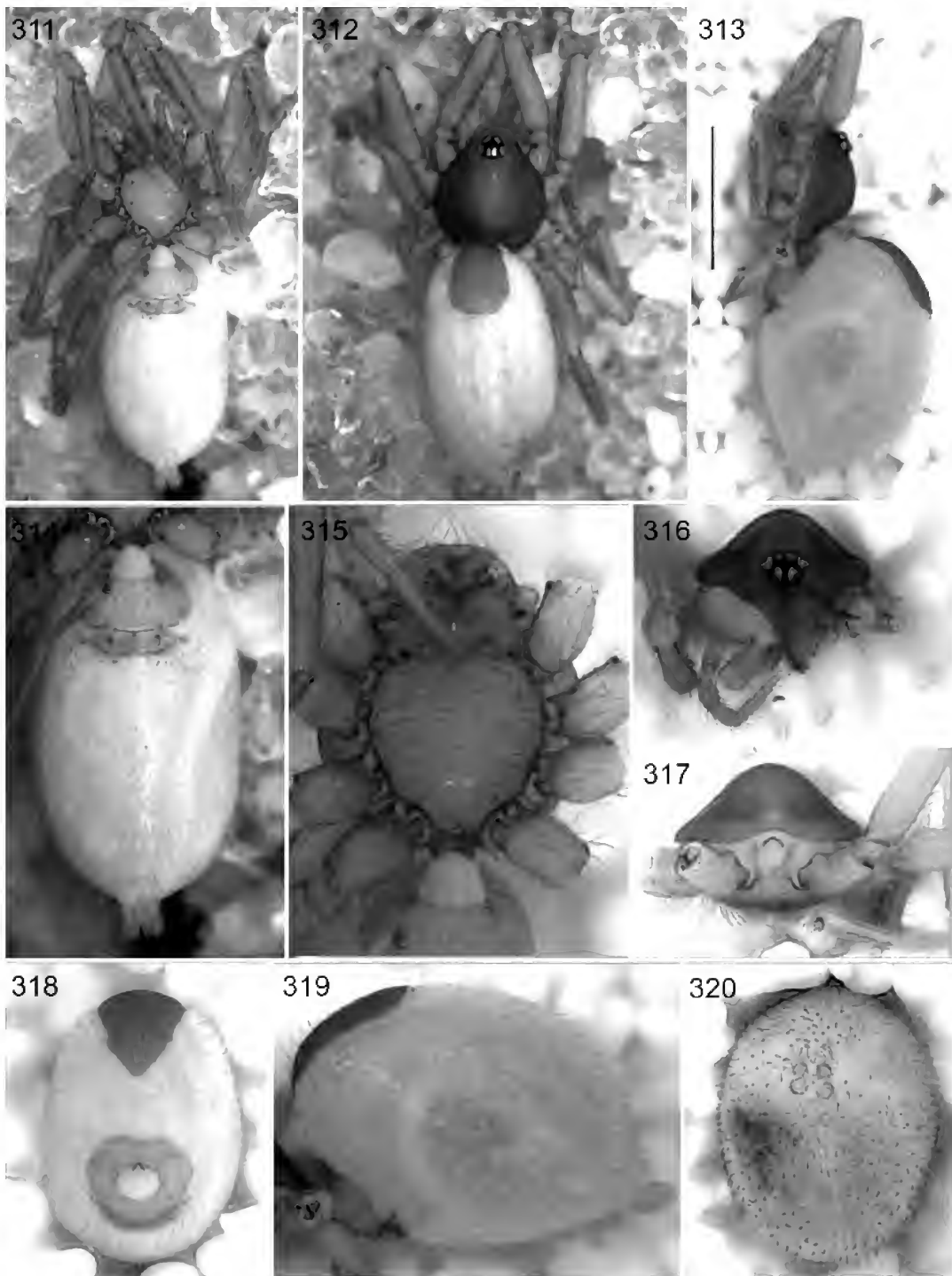
FIGURES 284–290. *Camptoscaphiella nepalensis*, new species, female (PBI_OON 23385). 284. Habitus, dorsal view. 285. Same, ventral view. 286. Carapace, dorsal view. 287. Same, anterior view. 288. Habitus, lateral view. 289. Epigynum, ventral view. 290. Same, dorsal view. Scale bars, habitus = 0.5 mm, epigynum = 0.1 mm.



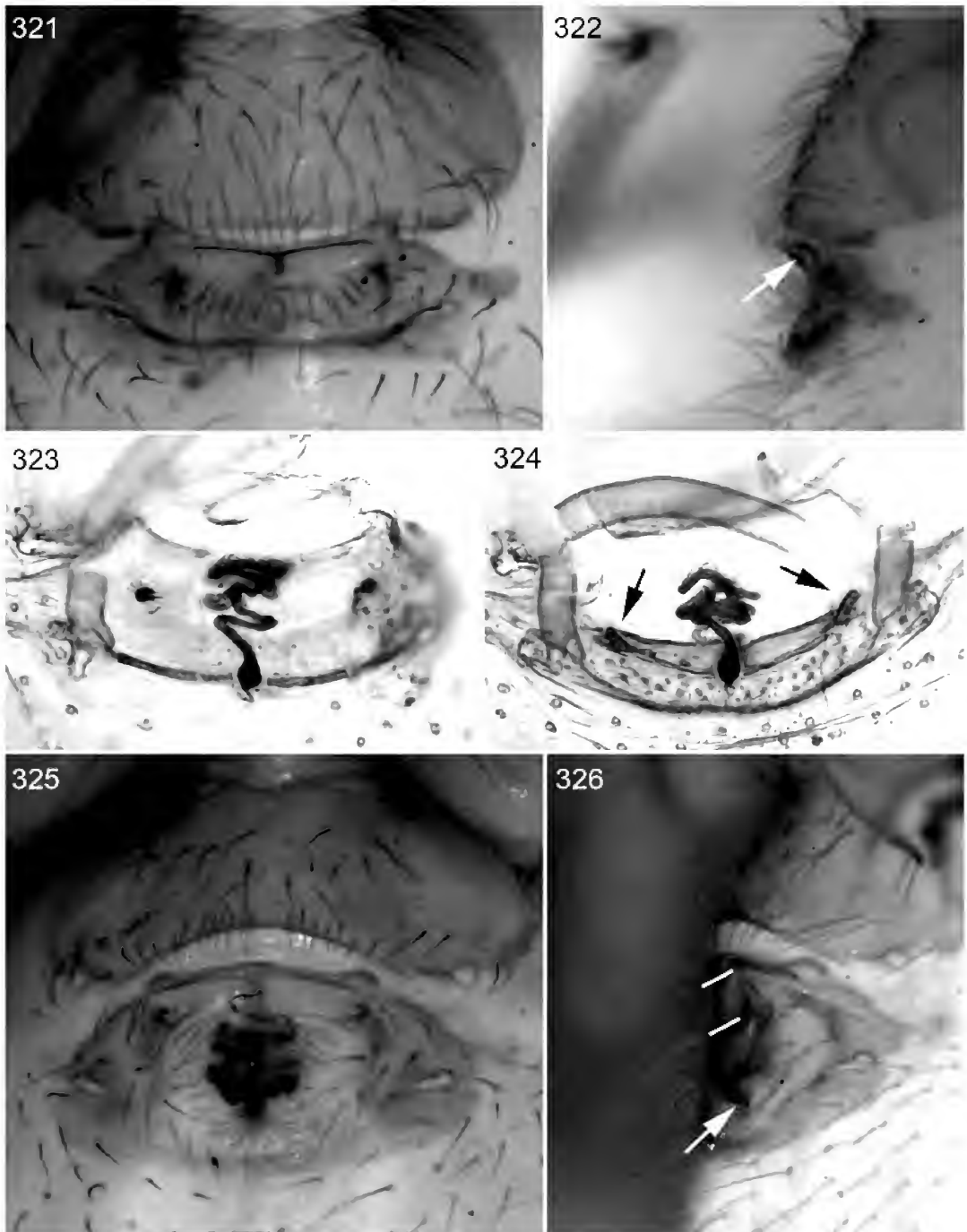
FIGURES 291–300. *Camptoscaphiella panchthar*, new species, female (PBI_OON 15771). 291. Habitus, dorsal view. 292. Same, ventral view. 293. Carapace, dorsal view. 294. Habitus, anterior view. 295. Same, lateral view. 296. Leg I, prolateral view. 297. Sternum, ventral view. 298. Abdomen, ventral view. 299. Carapace, lateral view. 300. Epigynum, dorsal view. Scale bars, habitus = 0.5 mm, epigynum = 0.1 mm.



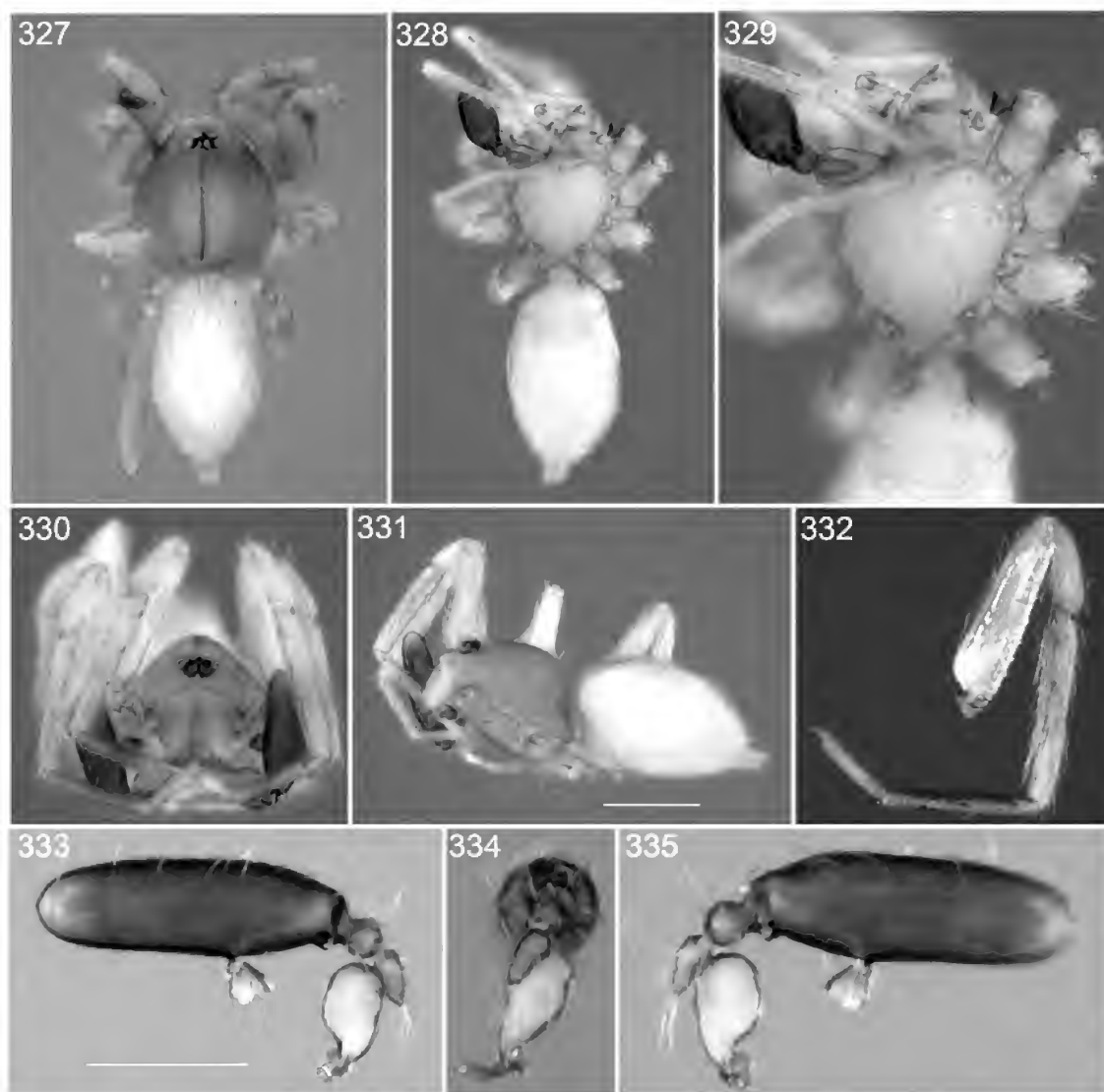
FIGURES 301–310. *Camptoscaphiella paquini*, new species, male (PBI_OON 02187). 301. Habitus, ventral view. 302. Same, dorsal view. 303. Same, lateral view, scale bar = 1 mm. 304. Abdomen, ventral view. 305. Sternum, ventral view. 306. Carapace, frontal view. 307. Same, posterior view. 308. Abdomen, anterior view. 309. Same, lateral view. 310. Same, posterior view.



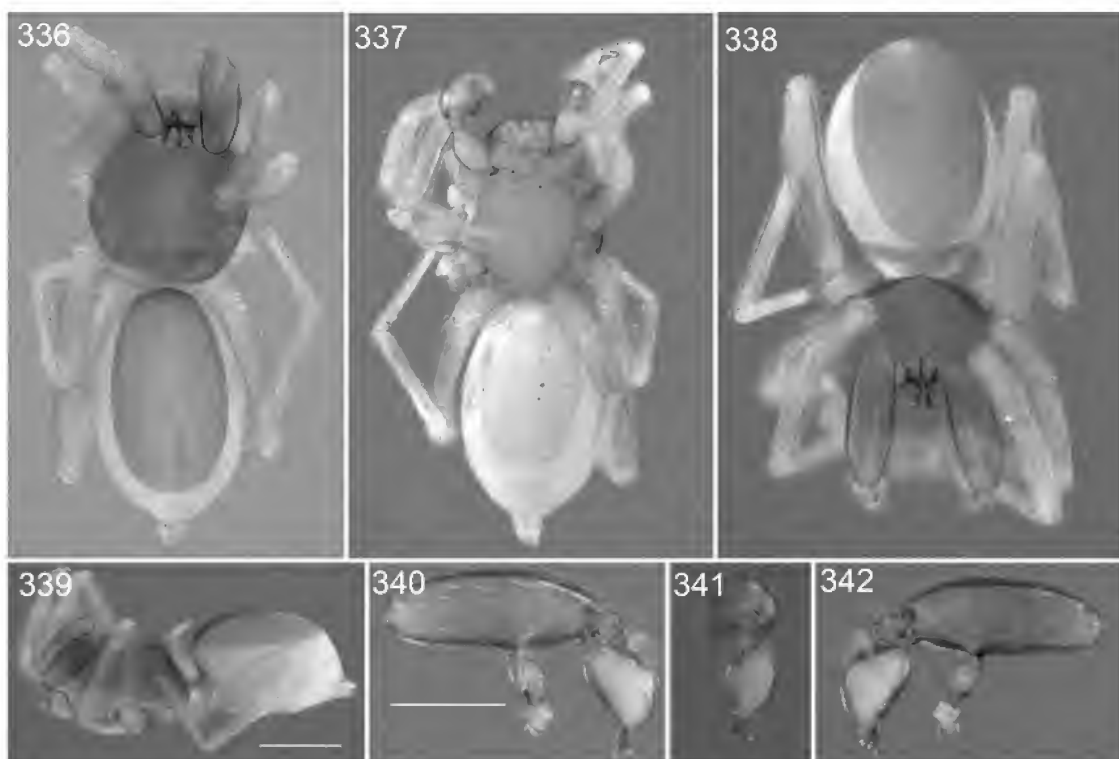
FIGURES 311–320. *Camptoscaphiella paquini*, new species, female (PBI_OON 03056). 311. Habitus, ventral view. 312. Same, dorsal view. 313. Same, lateral view, scale bar = 1 mm. 314. Abdomen, ventral view. 315. Sternum, ventral view. 316. Carapace, frontal view. 317. Same, posterior view. 318. Abdomen, anterior view. 319. Same, lateral view. 320. Same, posterior view.



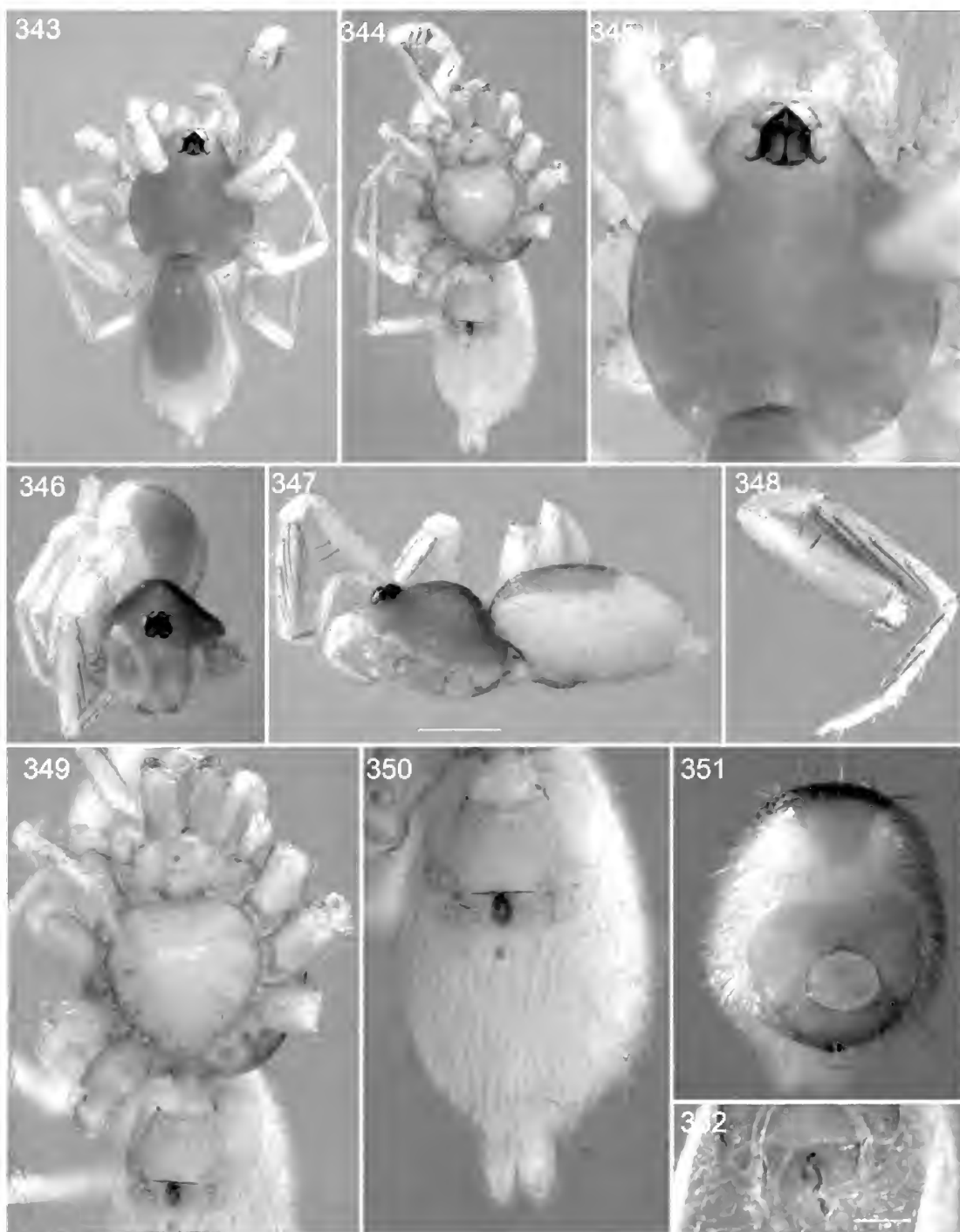
FIGURES 321–326. *Camptoscaphiella* and *Ischnothyreus* species, female epigastric regions. **321.** *Camptoscaphiella paquini*, new species (PBI_OON 03053), ventral view. **322.** Same, lateral view, arrow points to presumed copulatory opening. **323.** Same (PBI_OON 03049), digested with pancreatin, dorsal view. **324.** Same, posterior view, with arrows showing the bases of the (broken) apodemes. **325.** *Ischnothyreus* sp. (PBI_OON 02188), ventral view. **326.** Same, lateral view, with arrow to the presumed copulatory opening and dashes showing additional openings.



FIGURES 327–335. *Camptoscaphiella schwendingeri*, new species, male (PBI_OON 23365). 327. Habitus, dorsal view. 328. Same, ventral view. 329. Sternum, ventral view. 330. Carapace, anterior view. 331. Habitus, lateral view. 332. Leg I, prolateral view. 333. Palp, prolateral view. 334. Same, dorsal view. 335. Same, retrolateral view. Scale bars, habitus = 0.5 mm, palp = 0.25 mm.



FIGURES 336–342. *Camptoscapbiella simoni*, new species, male (PBI_OON 23343). 336. Habitus, dorsal view. 337. Same, ventral view. 338. Same, anteriodorsal view. 339. Same, lateral view. 340. Palp, prolateral view. 341. Same, dorsal view. 342. Same, retrolateral view. Scale bars, habitus = 0.4 mm, palp = 0.2 mm.



FIGURES 343–352. *Camptoscaphiella taplejung*, new species, female (PBI_OON 15760). 343. Habitus, dorsal view. 344. Same, ventral view. 345. Carapace, dorsal view. 346. Habitus, anterior view. 347. Same, lateral view. 348. Leg I, prolateral view. 349. Sternum, ventral view. 350. Abdomen, ventral view. 351. Abdomen, anterior view. 352. Epigynum, dorsal view. Scale bars, habitus = 0.5 mm, epigynum = 0.1 mm.

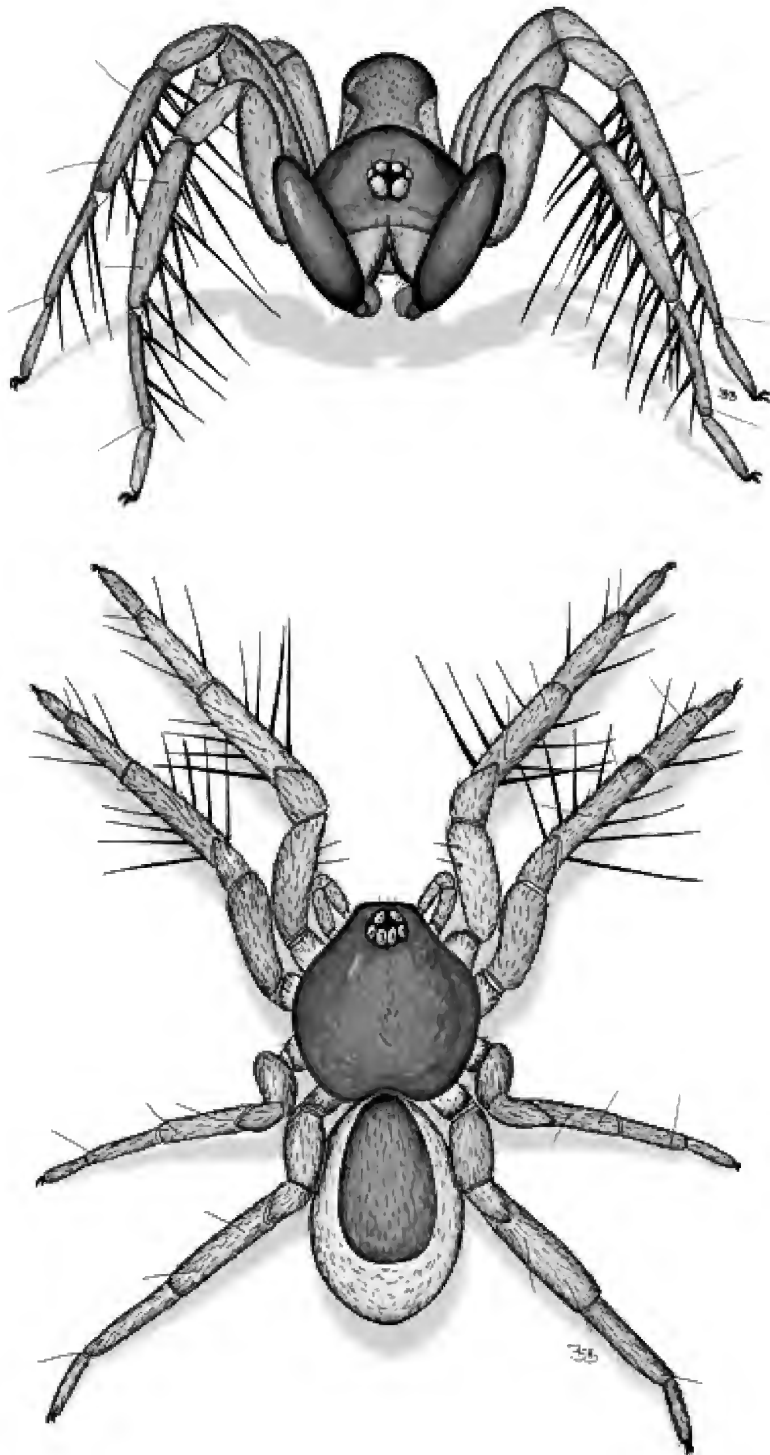


PLATE 1. *Camptoscaphiella loebli*, new species, habitus. Male (top), anterior view (PBI_OON 15618). Female (bottom), dorsal view (PBI_OON 15407).

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REFERENCES

- Abraham, N. In press. Revisão do Gênero *Neoxyphinus* Birabén 1953 (Araneae, Oonopidae).
- Álvarez-Padilla, F., and G. Hormiga. 2008. A protocol for digesting internal soft tissues and mounting spiders for scanning electron microscopy. *Journal of Arachnology* 35: 538–542.
- Baehr, B.C., M.S. Harvey, and H.M. Smith. In press. A review of the new endemic Australian goblin spider genus *Cavisternum* (Araneae: Oonopidae). *American Museum Novitates*.
- Brignoli, P.M. 1976. Spinnen aus Nepal, III. Über einige Spinnen aus dem Himalaya, dazu Revision einiger Arten aus dem Karakorum (Arachnida, Araneae). *Ergebnisse der Forschung-Unternehmens Nepal Himalaya* 5: 229–253.
- Brignoli, P.M. 1978. Ergebnisse der Bhutan-Expedition 1972 des Naturhistorischen Museums in Basel. Araneae: Fam. Oonopidae, Agelenidae, Hahniidae und Mimetidae. *Entomologica Basiliensia* 3: 31–56.
- Burger, M. 2009. Female genitalia of goblin spiders (Arachnida: Araneae: Oonopidae): a morphological study with functional implications. *Invertebrate Biology* 128 (4): 340–358.
- Burger, M., W. Nentwig, and C. Kropf. 2002. *Opopaea fosuma*, n. sp. from Sumatra, Indonesia (Araneae, Oonopidae). *Bulletin of the British Arachnological Society* 12: 244–248.
- Caporiacco, L. di. 1934. Aracnidi dell'Himalaia e del Karakoram. *Memorie della Società Entomologica Italiana* 13: 113–160.
- Deeleman-Reinhold, C.L. 1995. A new eyeless *Camptoscaphiella* from a Chinese cave (Arachnida: Araneae: Oonopidae). *Beiträge zur Araneologie* 4 (1994): 25–29.
- Fannes, W., and R. Jocqué. 2008. Ultrastructure of *Antoonops*, a new, ant-mimicking genus of Afro-tropical Oonopidae (Araneae) with complex internal genitalia. *American Museum Novitates* 3614: 1–30.
- Fannes, W., D.D. Bakker, K. Loosveldt, and R. Jocqué. 2008. Estimating the diversity of arboreal oonopid spider assemblages (Araneae, Oonopidae) at Afrotropical sites. *Journal of Arachnology* 36: 322–330.
- Grismado, C.J. In press. Description of *Birabenella*, a new genus of goblin spiders from Argentina and Chile (Araneae: Oonopidae). *American Museum Novitates*.
- Harvey, M.S., and K.L. Edward. 2007. Three new species of cavernicolous goblin spiders (Araneae, Oonopidae) from Australia. *Records of the Western Australian Museum* 24: 9–17.

- Platnick, N.I. 2009. The world spider catalog, version 9.5. New York: American Museum of Natural History. Internet resource (<http://research.amnh.org/entomology/spiders/catalog/index.html>).
- Platnick, N.I., and N. Dupérré. 2009a. The American goblin spiders of the new genus *Escaphiella* (Araneae, Oonopidae). *Bulletin of the American Museum of Natural History* 328: 1–151.
- Platnick, N.I., and N. Dupérré. 2009b. The goblin spider genus *Heteroonops* (Araneae, Oonopidae), with notes on *Oonops*. *American Museum Novitates* 3672: 1–72, 410 figures.
- Simon, E. 1893. *Histoire naturelle des araignées*. Paris: Roret, 1: 257–488.
- Song, D.X., M.S. Zhu, and J. Chen. 1999. *The Spiders of China*. Shijiazhuang: Hebei Science and Technology Publishing House, 640 pp.
- Tong, Y.F., and S.Q. Li. 2007. One new genus and four new species of oonopid spiders from southwest China (Araneae: Oonopidae). *Annales Zoologici (Warsaw)* 57: 331–340.

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